

THE AMPHIPODA OF SOUTHERN AFRICA

PART I

THE GAMMARIDEA AND CAPRELLIDEA OF SOUTHERN MOÇAMBIQUE

By

C. L. GRIFFITHS

C.S.I.R. Oceanographic Research Unit, Zoology Department, University of Cape Town

(With 11 figures)

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INTRODUCTION

The first comprehensive works on the Crustacea of southern Africa were those of T. R. R. Stebbing, culminating in his 'General catalogue of South African Crustacea' in 1910, which was largely based on the extensive collections of the S.S. *Pieter Faure*. K. H. Barnard continued to analyse the *Pieter Faure* material and in 1916 published descriptions of many new species and records, to be augmented in 1925 by a report on the last portion of the collection, bringing the total number of recorded species to 207. Barnard went on to publish more descriptions and a key to known species in 1940, and further additions to the fauna were forthcoming in 1951, 1955 and 1957.

Despite this excellent background, South African Amphipoda have subsequently been almost completely neglected, although collecting has continued unabated and many new records and undescribed species have undoubtedly accumulated, especially in the extensive collection of the University of Cape Town Ecological Survey.

It is in the light of these new data and of recent extensive taxonomic revisions that the decision has been made to synthesize existing knowledge of the South African amphipod fauna.

Mr Roy Dick has recently (1970) produced a key to, and distribution list of the Hyperiidea of southern Africa and it is the aim of the present work, and subsequent ones of a series, to cover the Gammaridea and Caprellidea of the same area (Africa south of 20°S) on a regional basis.

Moçambique has been selected as the subject of the first paper, since no previous literature specifically on the amphipods of this area appears to exist, although a checklist and key to the species of Inhaca Island (Macnae & Kalk 1958), descriptions of new species from Morrumbene estuary (Barnard 1916, 1955) and a key to common species of southern Africa (Day 1969) have appeared. Moreover, the recent International Indian Ocean Expedition, resulting in Ledoyer's work (1967*a, b*) on the Amphipoda of Malagasy has prompted the author's interest in the fauna of the mainland of Moçambique.

Data for this paper were provided by the following:

(*a*) An extensive survey of Morrumbene estuary by the Zoology Department of the University of Cape Town, involving visits in 1953, 1954, 1955 and 1968. During these expeditions to Moçambique, exploratory collections were also taken at Lagoa Poelala, Maxixe and Jangamo reef and the data from these collections are also included.

(*b*) Collections from Inhaca Island and Ponta Zavora made by a team of biologists from the South African Museum, Cape Town, in June 1971, and kindly loaned by them to the author.

(*c*) A series of dredge samples taken by the S.S. *Anton Bruun* during an International Indian Ocean Expedition cruise in 1964.

(*d*) Information has also been drawn from collections taken at Inhaca Island by the University of the Witwatersrand (Macnae & Kalk 1958, 1962*a, b*).

THE COLLECTING STATIONS

Fig. 1

Morrumbene estuary

Fig. 2

Description

This rich estuary, fed by the Morrumbene, Inhanombe and other minor rivers, opens into the northern end of Inhambane Bay (at 23°40'S/35°20'E). The Inhanombe is the largest of the rivers, flowing northwards through mangrove swamps before reaching a broad mixing basin between the San José Mongué mission station and Morrumbene village. The shallow mixing basin is about 2-3 kilometres wide at flood tide, its banks are mainly muddy in the upper reaches, except for a few sandy areas around Tinga-Tinga; but from the mission station to the mouth the banks are sand and the bottom sandy mud. The tortuous Inhanombe channel is about two metres deep opposite the mission station and reaches a maximum depth of 20 metres at Linga-Linga.

Tidal range at springs is about three metres at Mongué decreasing to two metres at Tinga-Tinga. Salinity (at high and low tides respectively) varied between 35‰ and 31,2‰ at Linga-Linga, 34,4‰ and 22,9‰ at Mongué, and between 33,8‰ and 11,8‰ at Tinga-Tinga.

The banks of the estuary are lined with at least three genera of mangrove

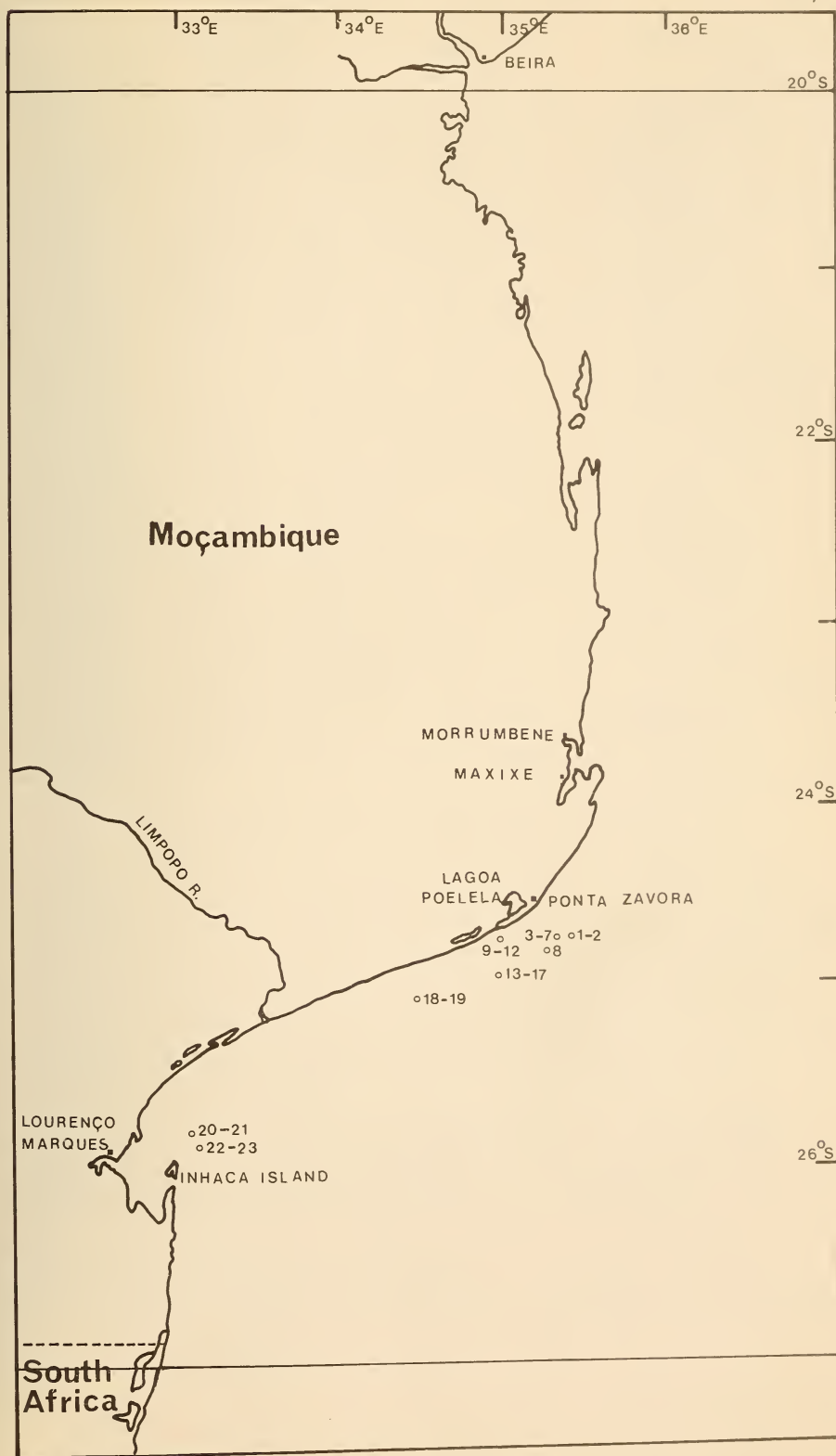


Fig. 1. Collecting stations in southern Mozambique (20° to 27° S) with PED stations numbered.

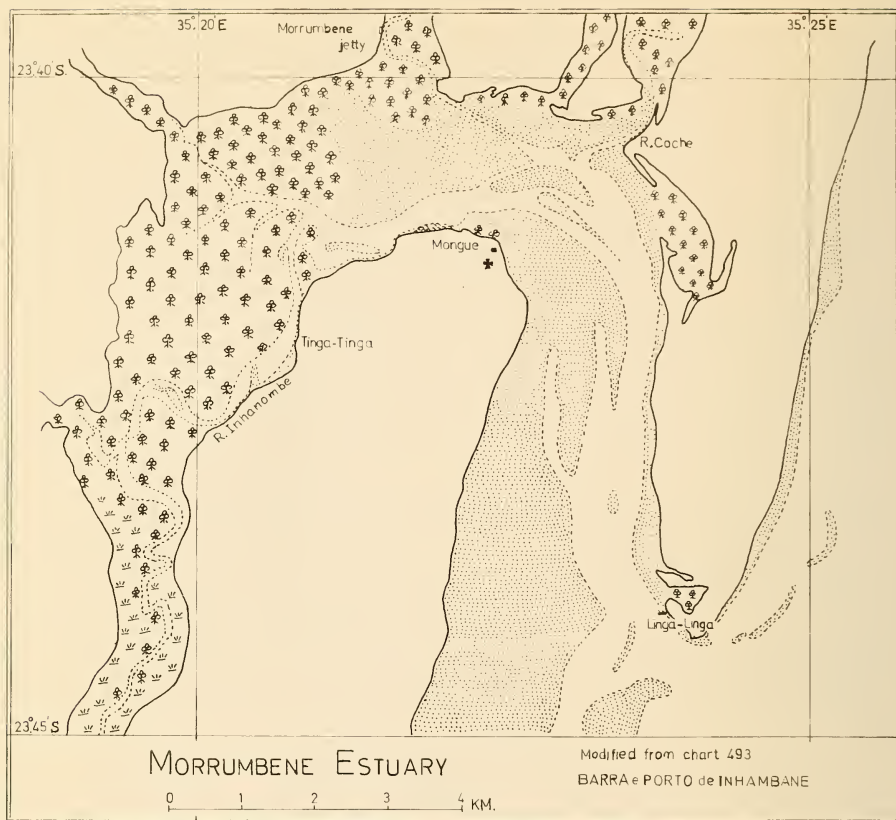


Fig. 2. Morrumbene estuary (after Day, unpublished).

including *Avicennia*, *Rhizophora* and *Ceriops*, these give way to *Phragmites*, *Barringtonia* and *Acrostichum* where salinity falls below 10‰. In the mixing basin sea grasses such as *Halodule* and *Cymodocea* are common near low water springs.

The survey of Morrumbene formed part of the University of Cape Town's estuarine survey series and a paper on the ecology of the estuary is in preparation by J. H. Day. Twenty-two species of amphipod were recovered during the survey. Both the absolute number of individuals and the number of species decreased in areas of low salinity.

Eighteen species were present in the mixing basin, of these only six were at all common (*Cheiriphotis megacheles*, *Grandidierella bonnieri*, *Hyale inyacka*, *Laetmatophilus purus*, *Lembos teleporus* and *Talorchestia australis*). Above Tinga-Tinga seven species were recorded, none of them common.

One particularly euryhaline species worthy of mention is *Grandidierella bonnieri* which was found from Linga-Linga to Tinga-Tinga and also recovered from a fresh-water lake adjoining Lagoa Pocelela.

Station list

Catalogue number	Date	Position	Substrate
MOR 30	19/1/54	Midchannel, Tinga-Tinga LWS	Sandy mud
MOR 31	19/1/54	In dense mangroves, Tinga-Tinga	Mud
MOR 37	20/1/54	Mid-tidal level, Linga-Linga	<i>Halodule</i> marsh
MOR 40	20/1/54	Midtide rocks, Linga-Linga	Rock
MOR 41	20/1/54	LWS, Linga-Linga	<i>Halodule</i> marsh
MOR 45	20/1/54	Dredge 6-9 m, Linga-Linga	—
MOR 52	21/1/54	Netting in mouth of Rio Coche	—
MOR 74	24/1/54	Netting at Mongué ferry	<i>Halodule</i> beds
MOR 75	18/1/54	Midtide at Mongué ferry	Sand
MOR 77	23/7/53	Diving 2-3 m, Linga-Linga	Sand and weed
MOR 85	11/7/54	Above HWS at fern bank	Mangrove roots
MOR 95	3/7/54	Handnetting (location?)	Aquatic vegetation
MOR 102	14/7/54	Netting at Linga-Linga	<i>Halodule</i> and <i>Cymodocea</i>
MOR 108	14/7/54	Dredge 1.5-4 m, Linga-Linga	Sand with <i>Cymodocea</i>
MOR 122	15/7/54	Dredge off Linga-Linga	—
MOR 124	15/7/54	Plankton netting, Linga-Linga	—
MOR 147	16/7/54	Netting, mouth of Rio Coche	—
MOR 179	18/7/54	Mangroves at Mongué ferry	—
MOR 180	18/7/54	Mongué ferry, HWS	Sand
MOR 193	19/7/54	Linga-Linga	Sand
MOR 212	15/7/54	LWS, Mongué ferry	Mangroves?
MOR 218	13/7/54	From wreck, Linga-Linga	Ship's hull
MOR 232	12/7/54	Rio Coche	—
MOR 238	12/7/54	Opposite Rio Coche	Sand
MOR 240	12/7/54	Opposite Mongué ferry	Mud
MOR 243	12/7/54	Mongué ferry	—
MOR 244	12/7/54	Mongué ferry	—
MOR 250	12/7/54	Tinga-Tinga	Mangroves
MOR 253	12/7/54	Fern bank	<i>Acrostichum</i>
MOR 255	12/7/54	Head of estuary of Inhanombe River	—

Subsidiary collections made during the expeditions to Morrumbene

(a) *Jangamo Reef* lies 96 kilometres south of Inhambane Bay at 24°06'S/35°30'E. A party of biologists from the University of Cape Town, led by Professor J. H. Day, visited the area from 7 to 10 July 1968. The reef was found to be of flat sandstone transected by gulleys and covered by shallow pools, the rock extending from high water neaps to low water springs. *Ulva* was dominant at higher levels, below which there was an area of red algal turf running to low water springs. At low tide *Idanthyrsus* formed large encrustations and zoanthids, algae, sponges, ascidians and hydrozoans fringed the gulleys. Corals were present but not abundant.

The dominant intertidal amphipods were *Elasmopus affinis* and *Elasmopus japonicus* which were present in approximately equal numbers and together accounted for over 75% of the collection. Of the 14 other species recorded, *Caprella equilibra* and *Cheiriphotis megacheles* were the most common.

Station list

Catalogue number	Date	Position
JAN 12, JAN 14	8/7/68	General collection of amphipods

(b) *Lagoa Poelela* (24°33'S/35°05'E), one of a series of brack-water lagoons forming a chain along the coast, was briefly visited by a team of University of Cape Town zoologists in January 1954. The lagoon was 30 kilometres long and 5 kilometres wide, the shore clean sand and the water crystal clear without any signs of aquatic vegetation and little sign of aquatic life. At the time of sampling salinity near the shore was 6,5‰ and the temperature at the surface was 19,5°C.

Only three amphipods were found in the lagoon, *Orchestia ancheidos* was common in weed along the drift-line, *Grandidierella bonnieri* in sand along and above the watermark and *Melita zeylanica* in the weedy shallows. With the exception of *O. ancheidos*, the same species were recovered from an adjoining freshwater lake.

		<i>Station list</i>	
<i>Catalogue number</i>	<i>Date</i>	<i>Position</i>	
POE 1	26/1/54	Netting along the shore	
POE 3	26/1/54	Digging between <i>Juncus</i> plants 30 cm above water level	
POE 6	26/1/54	Digging in waterlogged sand on shore	
POE 8	26/1/54	In weed along driftline	
POE 10	26/1/54	Handnetting in weed on the margin of a shallow freshwater lake south-west of the lagoon	
POE 12	26/1/54	Collecting along margin of freshwater lake	

(c) *Maxixe*. The township of Maxixe, which lies 19 kilometres south of Morrumbene estuary on the western shore of Inhambane Bay, was visited briefly in July 1953.

A rapid examination of the shore revealed only two species of amphipod, *Lembos podoceroideus* and *Chevalia aviculae*, both at low tidal levels on the sand banks and piles of the wharf.

		<i>Station list</i>	
<i>Catalogue number</i>	<i>Date</i>	<i>Position</i>	
PEA 2	24/7/53	General collection from low tide sand banks and piles, Maxixe	
PEA 4	24/7/53	General collection from low tide sand banks and piles, Maxixe	

Inhaca Island

Fig. 3

Detailed ecological descriptions of Inhaca Island may be found in Kalk (1958), Macnae & Kalk (1958) and Kalk & Macnae (1962a, b). The island lies at the tip of the Inhaca peninsula, forming an eastern boundary to Delagoa Bay. It is centred at 26°01'S/32°56'E with a maximum length of 11 kilometres and a width of 6 kilometres. The mangrove fringed northern bay and the Saco da Inhaca in the south contain extensive mud flats dominated by *Halodule* and *Cymodocea* through which narrow channels run. The Saco is more rocky than the northern bay and there is a young coral reef near Ponto Torres.

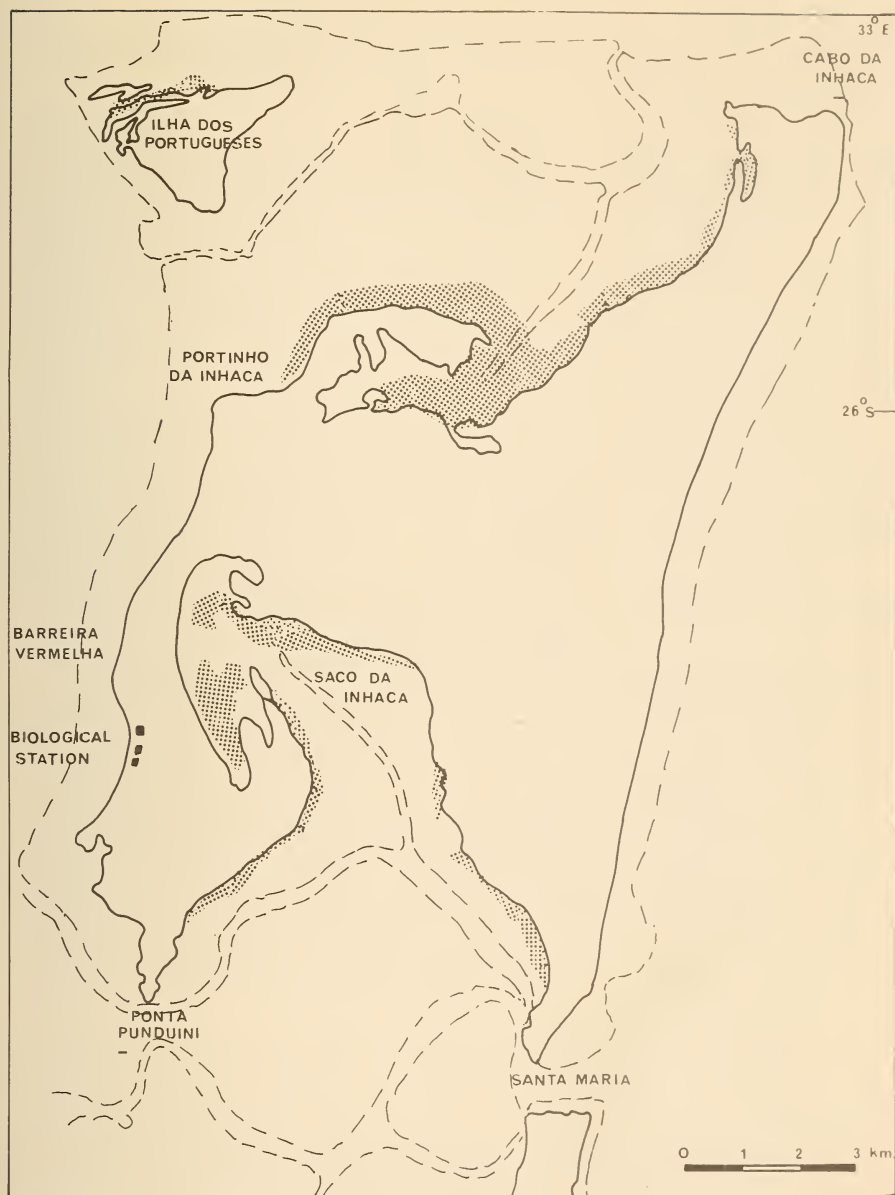


Fig. 3. Inhaca Island, showing features referred to in the text (after Macnae & Kalk, 1958).

The west coast, which borders shallow Delagoa Bay, exhibits intertidal sand flats up to 1 kilometre wide. These are often covered by coral debris or *Cymodocea* and opposite Barreira Vermelha there is a coral reef.

The eastern shore is exposed to the surf and is rocky along its whole length, though the rocks are usually only at intertidal levels. At Cabo da Inhaca there are three rock terraces, the highest not now immersed at any state of tide.

The island provides an extremely wide range of habitats, rock and sand being present in both exposed and sheltered areas at all tidal levels. Moreover, the landward side of the island, bathed by the warm waters of shallow Delagoa Bay, apparently represents an isolated area of true tropical fauna, while the open coast is considered subtropical, with coral growing on the rocks, rather than forming true reefs.

A collection of amphipods was made on the island by a team from the South African Museum in June 1971 and these, together with the species recorded by Macnae & Kalk, reveal a total of 22 species. Of the 16 species recovered during the South African Museum's brief collecting visit, 11 were new to Inhaca, an indication of the number of species still to be discovered.

The fauna is best grouped according to area of occurrence. In the northern bay, only one species is found, *Orchestia anomala*, which is common along the drift line. The eastern seaboard is also sparsely populated, only *Hyale grandicornis*, *Stenothoe valida* and a species of *Podocerus* having been found.

The southern bay is the richest area with 16 recorded species. Important among these are *Maera hamigera* and *Maera inaequipēs*, which are common in coral. *Cymadusa filosa*, *Ampithoe ramondi*, *Elasmopus affinis* and *Talorchestia australis* are common intertidally.

On the more muddy, sheltered west coast, 13 species have been found. *Cymodocea* is a habitat favoured by *Erichthonius brasiliensis*, *Cymodusa filosa*, *Caprella scaura* and *Aora typica*, while *Orthoprotella mayeri* is common on the hydroid *Lytocarpus*. *Maera hamigera* and *Maera inaequipēs* once again occur in coral. At high intertidal levels *Orchestia anomala* occurs among *Bostrychia*, *Hyale inyacka* under rocks on sand and *Talorchestia australis* under weed on the drift line.

Station list

Catalogue number	Date	Position
IN 158	June 1971	In a sponge, Saco da Inhaca
IN 159	June 1971	General collection, Santa Maria
IN 160	June 1971	General collection on mud, west coast
IN 161	June 1971	On <i>Cymodocea</i> , west coast

During their visit to Inhaca, biologists from the South African Museum also briefly visited Ponta Zavora (30°02'S/35°10'E) where they found five species of amphipod in the intertidal zone. *Elasmopus japonicus* and *Cymodusa*

filosa were fairly common, while single specimens of *Gammaropsis semichelatus*, *Amaryllis macrophthalma* and *Maera* sp. (female) were collected.

Dredge stations

Samples from 23 dredges forming part of a series taken by the S.S. *Anton Bruun* in August 1964 were donated to the University of Cape Town and are incorporated in the survey.

Station list

Cat. no.	Date	Position	Depth (m)	Substrate	Gear
PED 1-2	18/8/64	24°46'S/35°20'E	132	Rock and shelly sand	Rock dredge
PED 3-7	18/8/64	24°46'S/35°18'E	110	Coarse sand and rock	Rock dredge
PED 8	18/8/64	24°49'S/35°13'E	73	Shelly sand and rock	Rock dredge
PED 9-12	19/8/64	24°46'S/34°50'E	22	Shelly sand and rock	Rock dredge
PED 13-17	19/8/64	24°53'S/34°56'E	55	Fine grey sand and rock	Rock dredge
PED 18-19	19/8/64	25°07'S/34°34'E	112	Dark sandy mud	Agassiz dredge
PED 20-21	22/8/64	25°57'S/33°02'E	42	Shell and rock	Rock dredge
PED 22-23	22/8/64	26°00'S/33°05'E	135	Shell and rock	Rock dredge

These samples contained 27 species of amphipod, apparently separable into two groups according to substrate preferences.

Areas with fine substrates (PED 13-18) revealed 16 species while the coarser bottomed areas revealed 11 species, only five being common to both substrate types.

On shell, sand and rock, the most important species were *Gammaropsis atlantica*, *Maera inaequipes*, *Maera serrata* and *Orthoprotella mayeri*.

In the fine sand and mud areas no one species was recovered in even moderate numbers, indicating a sparse, mixed population of mud-loving burrowing types (such as *Ampelisca*, *Podocerus*, *Metaphoxus* and *Urothoe*). The few caprellids found here would have been living on the occasional rocks present.

SYSTEMATICS

The form of presentation used here follows that of J. L. Barnard and J. C. McCain, in that families, and genera within families, are presented in alphabetical order.

It will be noted that many major taxonomic changes have taken place in the years since K. H. Barnard's (1940) key to South African Amphipoda. The reader is referred to J. L. Barnard (1969b, 1970a) for diagnosis of gammarid taxa and to J. L. Barnard (1958) for a world species list. Information on the revised taxonomy of Caprellidea may be found in McCain (1970) and McCain & Steinberg (1970), the latter work also including bibliographies and synonymies for all known species.

For the convenience of readers unfamiliar with recent developments, relevant changes at family level since 1940 are listed below:

Old taxa	New taxa
Atylidae	Incorporated into Dexaminidae
Lepechinellidae	
Hyaellidae	Incorporated into Superfamily
Hyalidae	Talitroidea
Talidae	
Photidae	Incorporated into Isaeidae
Metopidae	Incorporated into Stenothoidae
Pontigeneiidae	Incorporated into Eusiridae
Jassidae	Becomes Ischyroceridae
Caprellidae	Split to form
	Phtisicidae
	Caprellidae (revised)
	Aeginellidae
	Caprogammaridae

In the following account, no attempt has been made to provide a full list of references or synonyms, but the reader is referred to works which will provide good descriptions and synonymy lists, and to those which refer specifically to the southern African region.

The holotypes of all new species have been placed in the South African Museum, Cape Town, the S.A.M. Catalogue numbers given are museum numbers, while other codes (MOR, PED, etc) refer to University of Cape Town collections, the number in brackets after the code refers to the number of individuals found.

Suborder GAMMARIDEA

Family **Ampeliscidae**

Ampelisca diadema (Costa, 1853)

Ampelisca assimilis: Sars, 1895: 168, pl. 58.

Ampelisca diadema: K. H. Barnard, 1916: 133.

Records: PED 15J (2).

Diagnosis: Article 3 of pereopod 5 longer than article 4; pereon segments 5-7 with ventral hooks; third pleonal epimeron rounded; pleon segment 4 with a high, evenly-rounded dorsal carina; antenna 1 slightly exceeding peduncle of antenna 2.

Distribution: Cosmopolitan.

Ampelisca fusca Stebbing, 1888

Ampelisca fusca Stebbing, 1888: 1052, pl. 105.

Records: PED 6K (1); PED 23Q (6).

Diagnosis: Article 4 of pereopod 5 twice the length of article 3, produced posteriorly to cover half article 5, produced portion setose, article 5 slightly produced anteriorly; four eyes, with corneal lenses, lower pair directed forward; pleon segment 4 saddle-shaped dorsally; antennae 1 and 2 equal and as long as body.

Distribution: Endemic, Cape Agulhas to Moçambique.

Ampelisca palmata Barnard, 1916

Ampelisca palmata K. H. Barnard, 1916: 136, pl. 28, figs 30-31.

Records: PED 15H (2).

Diagnosis: Article 3 of pereopod 5 longer than article 4, 4 with front apex narrowly produced along half the length of 5; third pleonal epimeron quadrate, scarcely produced; pleon segment 3 with a low subacute dorsal keel; antenna 1 ♀ much longer than peduncle of antenna 2.

Distribution: Southern and west Africa.

Family **Amphilochidae***Gitanopsis mariae* n. sp.

Fig. 4

Diagnosis of male: Head with extremely large probosciform rostrum, lateral cephalic lobe quadrate, eye of moderate size, black. Antenna 1 not setose, as long as head, flagellum seven-articulate, accessory flagellum absent. Antenna 2 slightly longer than 1, flagellum seven-articulate. Mandible with large triturative molar, palp article 1 distally expanded, articles 2 and 3 subequal, article 3 distally curved. Maxilla 1, palp biarticulate. Outer plate of maxilla 2 narrower than inner. Outer lobe of maxilliped slightly excavate, palp four-articulate, articles 1 and 2 subequal and article 2 expanded distally.

Gnathopods 1 and 2 very weak and slender with gnathopod 2 slightly the larger. Coxa 1 rounded and very small, partially concealed by coxa 2. Coxa 3 antero-distally produced, coxa 4 deeply excavate posteriorly.

Pereopods 3-5, article 2 almost as wide as long. Third pleonal epimeron rounded and somewhat produced postero-inferiorly.

Uropods 1-3, outer rami marginally shorter than inner. Telson dorsally excavate, 70% length of peduncle of uropod 3, tapering distally, apically tridentate.

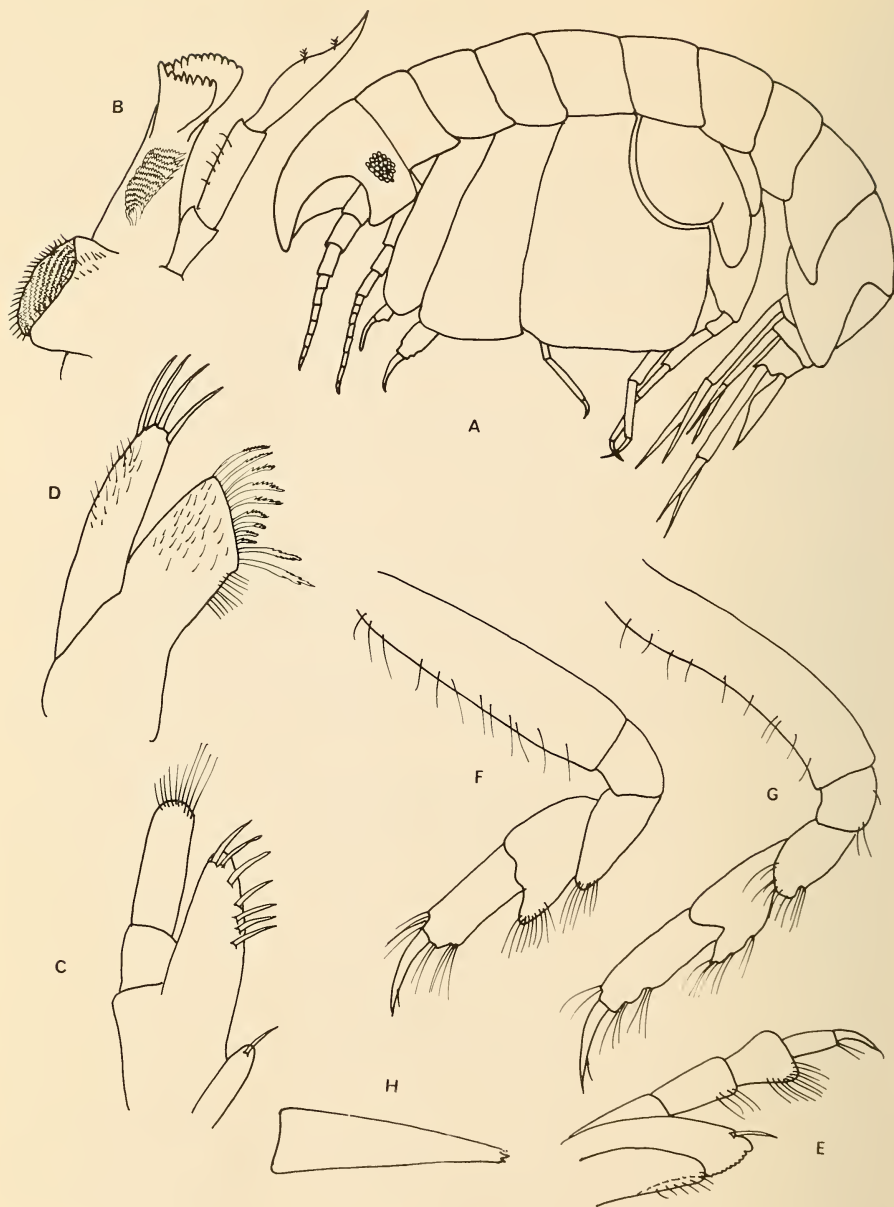


Fig. 4. *Gitanopsis mariae* n. sp., holotype, male, 7 mm.

A. Lateral view. B. Mandible. C. Maxilla 1. D. Maxilla 2. E. Maxilliped. F. Gnathopod 1.
G. Gnathopod 2. H. Telson.

Holotype: Male, 7 mm, unique. S.A.M. A 13066.

Type-locality: Collected at Santa Maria, Inhaca Island, by biologists of the South African Museum, June 1971.

Records: IN 159J.

Remarks: This species is easily recognized by its distinctive rostrum, which is much larger than is usual in this genus, and by the extremely weak gnathopods, which are unlike those of any other representatives of the genus.

Gitanopsis pusilla Barnard, 1916

Gitanopsis pusilla K. H. Barnard, 1916: 144. Stephensen, 1949: 8, fig. 1.

Records: PED 21E (1); IN 158C (1).

Diagnosis: Distinguished from other members of the family by the very short pyriform telson which is less than half the length of the peduncle of uropod 3; body smooth; process of article 5 of gnathopod 1 extending half the length of article 6, palm transverse, convex, defined by two spines.

Distribution: Tristan da Cunha, Kerguelen, South Georgia, Lambert's Bay to Moçambique.

Family **Ampithoidae**

Ampithoe ramondi (Audouin, 1826)

Ampithoe vaillanti: K. H. Barnard, 1916: 253.

Ampithoe ramondi: J. L. Barnard, 1970b: 50, figs 18-19.

Records: IN 159C (8); JAN 12J (1); MOR 74J (1); MOR 212C (2).

Diagnosis: Accessory flagellum absent; gnathopods 1 and 2 with article 2 lobed; palm of gnathopod 2 defined by a conspicuous lobelike tooth, dactyl serrate; outer ramus of uropod 3 terminating in two strongly recurved spines.

Distribution: Cosmopolitan in warm and temperate seas.

Cymadusa filosa Savigny, 1818

New synonymy:

Grubia australis K. H. Barnard, 1916: 258.

Grubia filosa: Shoemaker, 1935: 245, figs 4, 5.

Cymadusa australis: K. H. Barnard, 1940: 480.

Cymadusa filosa: J. L. Barnard, 1955: 29, fig. 15.

Records: MOR 218D (1); IN 160B (3); JAN 12C (2); PEA 24C (3).

Remarks: *C. australis* has previously been separated from *C. filosa* by the lack of plumose setae on antenna 2 and coxae 1-4 in the adult male, and by the lack of

distal lobes on article 2 of gnathopods 1 and 2. Barnard's types of *C. australis*, however, included only one adult male, and subsequent samples (including some from the type locality) identified by Barnard as *C. australis* did have plumose setae. Re-examination of the type specimens has shown that small pellucid lobes on the gnathopods are present, and that the females do not differ in any respect from females of *C. filosa*.

Since no more material corresponding to the male type of *C. australis* has been found, it seems more than likely that the one male type is aberrant, having failed to develop the plumose setae of an adult male. (It is well known that plumose setae develop with maturity and are fully developed only in aged males.)

The largest specimen so far recovered, a male of over 30 mm, showed plumose setae on the telson, fringing the peduncles of the uropods, on the anterior edge of article 2 of the pereiopods and the gnathopods, on the peduncle of antenna 2 and on the ventral margin of the head.

Distribution: Circumtropical.

Paragrubia vorax Chevreux, 1901

Fig. 5

Paragrubia vorax: J. L. Barnard, 1965: 541, fig. 35. Ledoyer, 1967: 135, fig. 23.

Records: JAN 12B (3) (the first record of this species from the southern African mainland).

Diagnosis: Gnathopod 1 considerably larger than 2, article 6 broadly expanded in adult males, palm slightly oblique and strongly concave. Young males show a strong palmar spine but this is lost with age. Accessory flagellum present.

Distribution: Tropical Indo-Pacific.

Family **Aoridae**

Aora typica Kröyer, 1845

Aora typica: Ledoyer, 1967: 131, fig. 15.

Records: IN 161 A (1).

Diagnosis: Easily recognized by gnathopod 1 which has a proximal tooth on the anterior margin of article 2 and a long distal projection on article 4.

Distribution: Cosmopolitan.

Lembos podocerooides Walker, 1904

Lembos podocerooides Walker, 1904: 279, pl. 6.

Records: PED 6 Q (2); PEA 2 L (6).

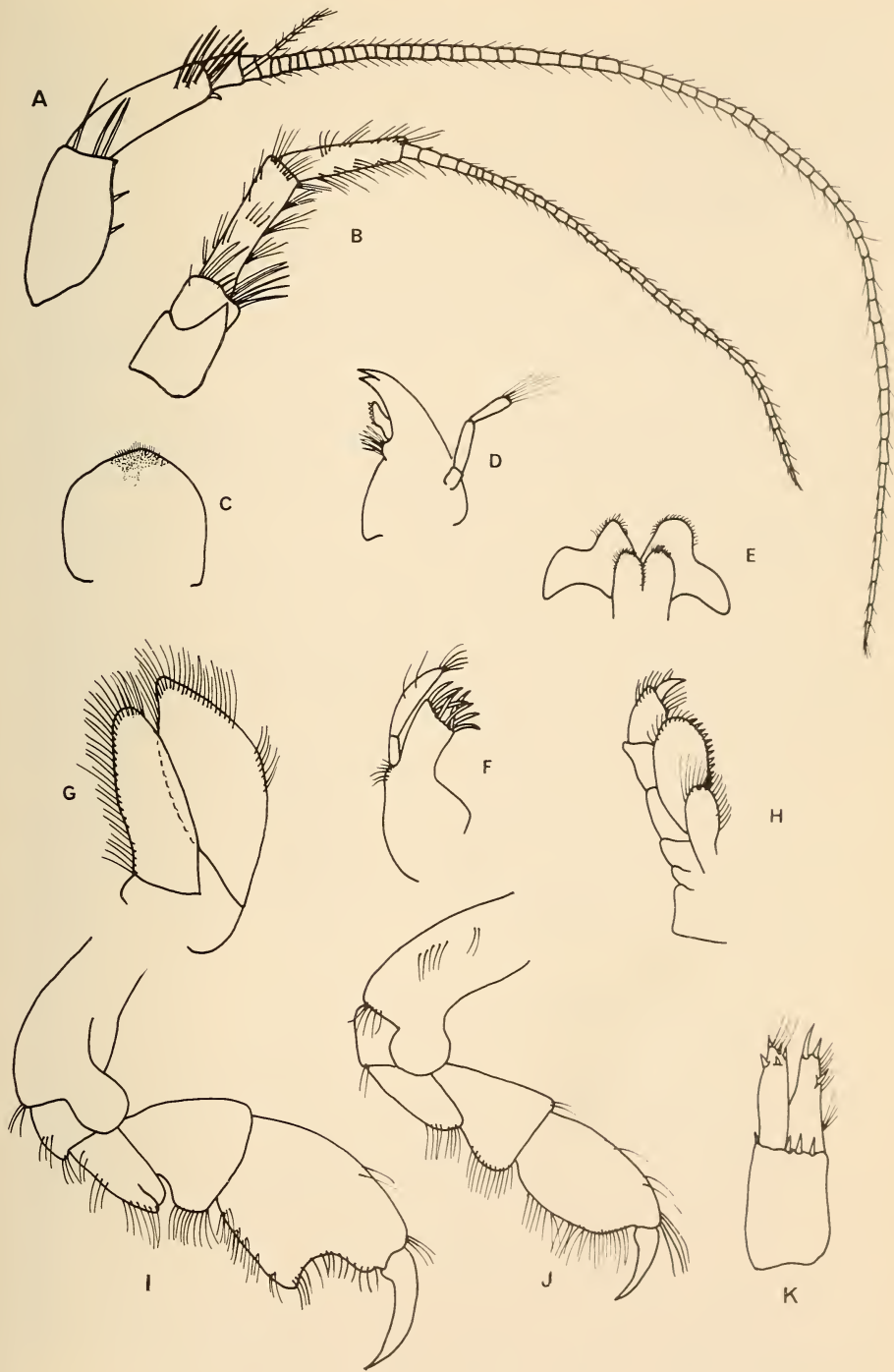


Fig. 5. *Paragrubia vorax* Chevreaux, male, 10 mm.

A. Antenna 1. B. Antenna 2. C. Upper lip. D. Mandible. E. Lower lip. F. Maxilla 1. G. Maxilla 2. H. Maxilliped. I. Gnathopod 1. J. Gnathopod 2. K. Uropod 3.

Diagnosis: Gnathopod 2 of male with the base of the hand produced backwards in a long pointed spur and the palm with a small semicircular sinus near the finger hinge; the posterior and lower margins of the third pleonal epimeron are convex and the postero-inferior corner is slightly produced with a diagonal ridge running across the epimeron to it.

Distribution: Indian Ocean, Red Sea.

Lembos teleporus Barnard, 1955

Lembos teleporus K. H. Barnard, 1955: 94, fig. 47. Ledoyer, 1967: 135, figs 16-17.

Records: IN 160 C (2); MOR 77 W (7); MOR 102 P (2); MOR 147 J (1); MOR 212 H (21).

Diagnosis: Pereon segment 3 with a strong ventral spine in adult males; article 6 of gnathopod 1 male three times the length of article 5, widening distally, palm with a blunt tooth near finger hinge, palmar angle quadrate, palm and dactyl crenulate.

Distribution: Malagasy, Moçambique, South West Africa.

JANICE, n. gen.

Generic diagnosis (male): Article 3 of antenna 1 shorter than article 1, accessory flagellum absent; gnathopod 1 subchelate, articles 4-6 lacking teeth, article 6 slightly shorter than, and of subequal width to, article 5; gnathopod 2 heavily setose, article 4 projecting to protect article 5 posteriorly, article 5 wider than 6 but subequal in length; uropod 3 uniramous, ramus equal to peduncle.

Remarks: The lack of teeth on gnathopod 1 and the complete lack of accessory flagellum are alone sufficient to demand the erection of a new genus. In addition, the structure of gnathopod 2 is unique among Aoridae.

Type-species: *Janice spinidactyla* n. sp.

Janice spinidactyla n. sp.

Fig. 6

Diagnosis of male: Head as long as two pereon segments; eyes small, round, dark. Antenna 1 extending to end of pereon segment 5, ratio of peduncular articles 2 : 3 : 1, flagellum subequal to peduncle and composed of 18 articles, accessory flagellum absent. (Antenna 2 missing.) Mandible with large triturative molar and three-articulate palp, lacinia mobilis 2-toothed with seven spines proximally.

Gnathopod 1 larger than 2, subchelate, articles 4-6 lacking teeth, setose posteriorly, article 6 as wide as, but slightly shorter than, article 5, palm transverse, convex, defined by two large spines and with a few small spines along its edge, dactylus slightly longer than palm and cut into four teeth.

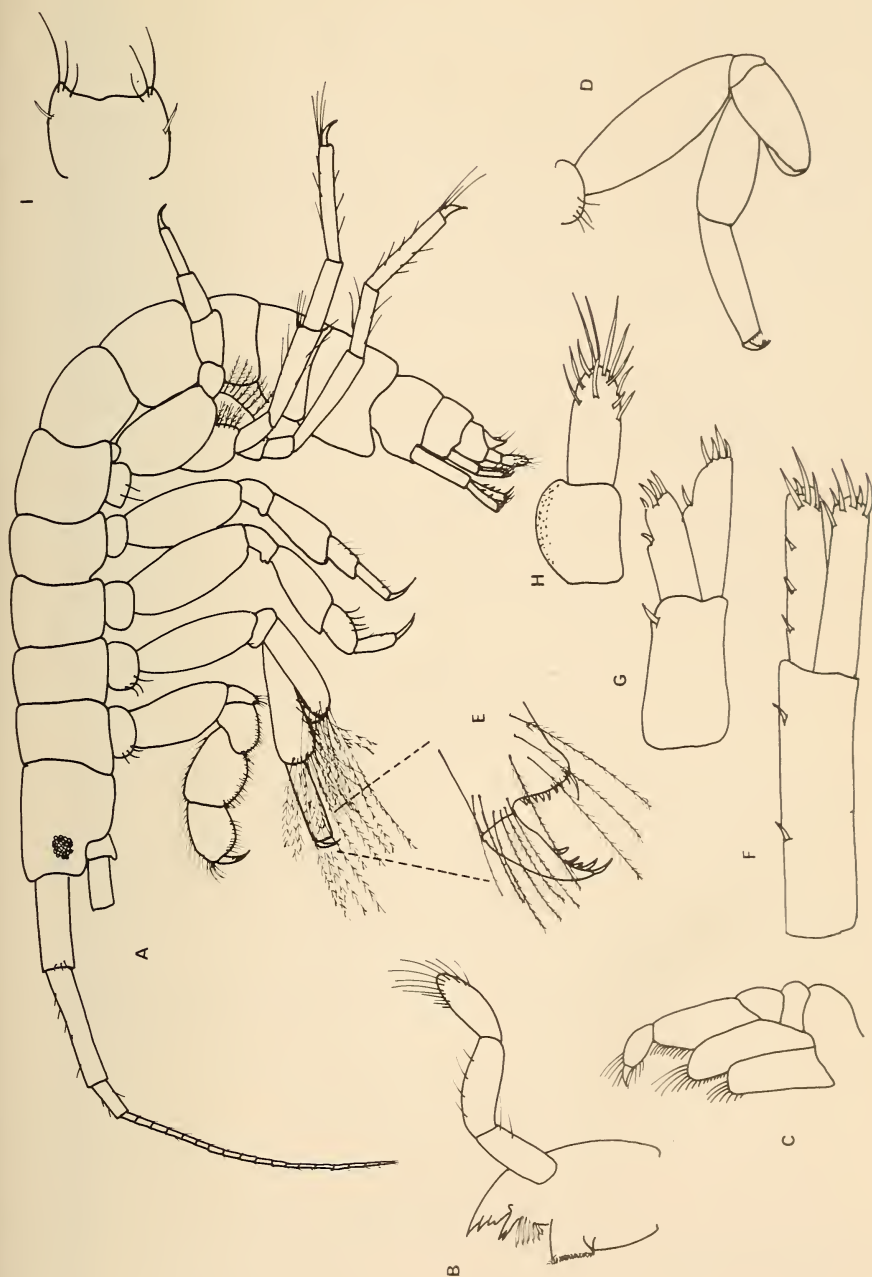


Fig. 6. *Janice spindactyla* n. gen., n. sp., holotype, male 6 mm.
A. Lateral view. B. Mandible. C. Gnathopod 2 without its setae. D. Tip of article 6 and article 7 of gnathopod 2. E. Uropod 1. F. Uropod 2. G. Uropod 3. H. Telson.

Article 4 of gnathopod 2 with a spoon-shaped projection extending nearly half the length of article 5, with long, plumose setae along its margins; article 5 as long as, and wider than, article 6 and extremely setose posteriorly, article 6 narrow, palm transverse; four large and many small spines along its length; dactylus matching palm with ten spines which become longer distally.

Pereiopods 1 and 2 glandular; pereiopods 3-5 with article 2 slightly expanded, that of pereiopod 5 extremely setose posteriorly.

Uropod 1 projecting to the end of uropod 3, rami subequal and $\frac{3}{4}$ length of peduncle, each bearing three spines dorsally and five or six terminally. Uropod 2 half the length of 1, rami subequal and slightly shorter than peduncle, each with one dorsal and five terminal spines. Uropod 3 half the length of 2, uniramous, ramus slightly longer than peduncle, cylindrical, terminating in about 12 long spines.

Telson not extending to end of peduncle of uropod 3, emarginate, fleshy, two lateral and three terminal setae on each side.

Holotype: Male, 6 mm. S.A.M. A 13067.

Type-locality: Found amongst *Acrostichum*, Morrumbene estuary above Tinga-Tinga, 12 July 1968. Salinity at capture site 10‰.

Records: MOR 253L.

Paratype: One male, MOR 253L.

Family **Colomastigidae**

Colomastix pusilla Grube, 1864

Colomastix pusilla: H. K. Barnard, 1925: 346. J. L. Barnard, 1955: 39-42, fig. 20.

Records: MOR 283 L (1).

Diagnosis: Distinguished from other members of the family by the smoothly rounded telson; uropod 3 rami equal; eyes in live specimen with red lenses outlined in white; flagellum of antenna 1 two-articulate.

Remarks: Probably considerably more common than the literature suggests since, with its small size and slender body, it is likely to pass through the sorting screens used by many workers.

Distribution: Cosmopolitan in tropical and temperate seas.

Family **Corophiidae**

Cerapus tubularis Say, 1818

Cerapus abditus: Stebbing, 1910b: 616, pl. 55A.

Cerapus tubularis: J. L. Barnard, 1962: 61, figs 27-28. Ledoyer, 1967: 137, fig. 27.

Records: MOR 108 F (1); PED 7 Q (2); PED 11 X (4); PED 12 W (4).

Diagnosis: Rostrum prominent; article 3 of antenna 1 as long as article 1, article 1 with a sharp ventral projection; gnathopod 2 male extremely powerful, article 5 with a large postero-distal triangular process and a smaller process near the articulation with article 6; uropod 2 uniramous.

Remarks: *C. abditus* has been found to be the adult of *C. tubularis*, the main source of misidentification having been Stebbing (1906) who restricted *C. tubularis* to forms with only three flagellar articles on antenna 1, whereas the number is, in fact, variable between two and five. Possibly development in colder regions is retarded, making the terminal '*abditus*' type rarer.

Distribution: Cosmopolitan in warm and temperate seas.

Corophium triaenonyx Stebbing, 1904

Corophium triaenonyx Stebbing, 1904: 25, pl. 6A. K. H. Barnard, 1940, 482.

Records: MOR 238 K (1); MOR 240 G (1); MOR 243 X (1); MOR 253 D (1); IN 158 A (2).

Diagnosis: Antenna 2 male with article 4 distally produced into a large curved tooth, a smaller tooth on its inner side; article 7 of gnathopod 2 markedly tri-dentate, the third and largest tooth forming the unguis, pleon segments 4-6 distinct.

Distribution: Tropical Atlantic, Indian Ocean, Mediterranean, Chilka Lake.

Ericthonius brasiliensis (Dana, 1853)

Ericthonius brasiliensis: Stebbing, 1910a: 463. J. L. Barnard, 1955: 37. Ledoyer, 1967: 137, fig. 30.

Records: MOR 218 E (1); JAN 12 H (8); PED 10 T (1); PED 15 M (1); amongst *Cymodocea* at Inhaca (Macnae & Kalk, 1958).

Diagnosis: Head not rostrate; gnathopod 2 male very powerful, article 5 postero-distally with a large bidentate process, dactyl very strong, falciform; uropods 1 and 2 sublamellar, minutely pectinate, uropod 3 uniramous, ramus half the length of peduncle and bidentate at tip.

Distribution: Cosmopolitan in tropical and temperate seas.

Grandidierella bonnier Stebbing, 1908

Grandidierella bonnier: Ledoyer, 1967: 137, fig. 28a.

Records: MOR 30 T (3); MOR 30 U (3); MOR 41 N (1); MOR 52 N (2); MOR 74 H (7); MOR 77 Z (3); MOR 102 N (1); MOR 240 F (7); MOR 243 Y (1); POE 1 A (1); POE 3 D (common); POE 6 A (common); POE 10 F (1); POE 12 G (5).

Diagnosis: Pereon segment 1 in male with a strong medio-ventral spiniform

process; gnathopod 1 male with article 5 not narrowing distally, a strong spinose projection on inner apical corner, a smaller one on the distal margin, and a spine on the lower margin.

Distribution: Atlantic and Indian Oceans, Caribbean.

Siphonocetes orientalis Walker, 1904

Siphonocetes orientalis Walker, 1904: 294, pl. 7, fig. 49. K. H. Barnard, 1916: 270.

Records: MOR 124 F (2).

Diagnosis: Eyes poorly developed; flagellum of antenna 2 of one long and two short densely setose articles with characteristic marginal and apical unguiform spines; flagellum of antenna 1 subequal to peduncle and consisting of 10–14 articles; rostrum acute and deflexed.

Distribution: Tropical Indo-Pacific.

Family **Dexaminidae**

Polycheria atolli Walker, 1905

Polycheria antarctica: K. H. Barnard, 1916: 211.

Polycheria atolli: Ledoyer, 1967: 131, fig. 13a.

Records: PED 10 P (4); PED 15 Q (1).

Diagnosis: Urosome segments with dorsal carinae, segments 2 and 3 fused; pereopods chelate; uropods 1 and 3 subequal, 2 much shorter with outer ramus half the inner; telson cleft to base.

Distribution: Antarctic and southern Oceans, tropical Indian Ocean.

Family **Eusiridae**

Eusiroides monoculoides (Haswell, 1880)

Eusiroides monoculoides: K. H. Barnard, 1916: 174. J. L. Barnard, 1964: 221, fig. 1.

Records: PED 15 K (1).

Diagnosis: Gnathopods subchelate, article 5 lobate, shorter than 6; third pleonal epimeron posteriorly convex with 10–12 upturned teeth; telson cleft half its length, apices bidentate.

Distribution: Circumtropical.

Family **Gammaridae**

Elasmopus affinis Della Valle, 1893

Elasmopus affinis: Sars, 1895: 521, pl. 183.

Records: JAN 12 K (1); JAN 12 M (105); IN 159 G (f.c.); PED 10 R (4); PED 15 N (2).

Diagnosis: Pereiopods robust, article 2 of pereiopod 5 two-thirds as wide as long; outer ramus of uropod 3 larger than inner, two fascicles of spines on outer edge, tips of both rami obliquely truncate and densely spinose; telson narrowly cleft, tip of each lobe obliquely truncate with three or four apical spines. Gnathopod 2 ♂ with 3-spined tubercle at base of dactylus.

Distribution: Mediterranean, Atlantic, southern Indian Ocean.

Elasmopus japonicus Stephensen, 1932

Elasmopus spinimanus (non Walker, 1905): K. H. Barnard, 1925: 358.

Elasmopus japonicus: Sivaprakisam, 1968: 278, figs 3-5.

Records: JAN 12 A (98); PEA 24 E (8).

Diagnosis: Article 6 of gnathopod 2 large, a rounded process at the base of the dactylus bears eight strong spines on its margin and three more at its base, finger less than half the length of article 6.

Remarks: The specimens identified by K. H. Barnard (1916) have a dorsal keel on pleon segment 4 which excludes them from *E. spinimanus*. They agree closely with Stephensen's figures of *E. japonicus*.

Distribution: Indo-Pacific, extending to South West Africa.

Maera hamigera (Haswell, 1880)

Maera hamigera: K. H. Barnard, 1916: 196, pl. 27, figs 11-12. J. L. Barnard, 1965: 507, fig. 16.

Records: IN 158 B (4); IN 159 A (8); IN 160 E (1).

Diagnosis: Body not dorsally dentate, posterior edge of third pleonal epimeron serrate; uropod 3 extending much beyond 1 and 2, rami equal; right gnathopod 2 male larger than the left, palm defined by a strong tooth followed by a marked concavity and a number of further teeth (six in these specimens but variable).

Distribution: Indo-Pacific.

Maera inaequipes (Costa, 1851)

Maera inaequipes: K. H. Barnard, 1916: 193. J. L. Barnard, 1959: 25, pl. 5.

Records: JAN 12 D (1); IN 160 A (1); PED 23 S (1).

Diagnosis: Gnathopod 2 with a sinus in centre of transverse palm, the stout dactylus having a rounded tooth which fits the depression; article 2 of pereiopod 5 with six or seven serrations; uropod 3, rami unequal, truncated; telson cleft to base, each lobe bidentate, with four or five terminal spines.

Distribution: Cosmopolitan in tropical and temperate seas.

Maera serrata Schellenberg, 1938

Maera inaequipes serrata: Ledoyer, 1967: 127, fig. 9.

Maera serrata: J. L. Barnard, 1970b: 155, figs 96-97.

Records: PED 6 S (1); PED 10 N (19).

Diagnosis: Differs from *M. inaequipes* only by the serrated posterior border of the third pleonal epimeron; the number of serrations is variable, the present specimens having from three to seven teeth.

Distribution: Indo-Pacific (this is the first record from the southern African mainland).

Mallacoota subcarinata (Haswell, 1880)

Elasmopus subcarinatus: Stebbing, 1910: 458.

Maera subcarinata: K. H. Barnard, 1940: 460, fig. 26.

Records: PED 21 D (1).

Diagnosis: Pleon segment 3 bicarinate, the two teeth apically inclined towards one another; gnathopod 2 palm spinose with a central cavity containing a strong tooth; telson with widely divergent lobes, their tips bidentate.

Distribution: Indian Ocean, Pacific, Mediterranean.

Melita appendiculata (Say, 1818)

Melita fresneli: Stebbing, 1910b: 596. K. H. Barnard, 1916: 189, pl. 28, fig. 32.

Melita appendiculata: J. L. Barnard, 1970b: 161, figs 103, 104.

Records: MOR 45 E (2); MOR 45 G (2); MOR 77 V (5); MOR 124 D (1); PED 15 F (6); PED 18 U (1); IN 159 D (4).

Diagnosis: Pleonal tooth formula 7 : 7 : 7 : 5 : 2; pleonal epimeron 3 produced into a long tooth; gnathopod 2 male unequal, either the larger, article 6 with a characteristic spoon-shaped palm, three teeth near finger hinge, dactyl powerful, hind margin of article 6 longer than front margin; article 2 of pereopods 4 and 5 narrowing distally, not produced postero-inferiorly.

Distribution: Cosmopolitan.

Melita zeylanica Stebbing, 1904

Melita inaequistylis: (part) K. H. Barnard, 1916: 191.

Melita zeylanica: Sivaprakasam, 1966: 112, fig. 12a-j.

Records: MOR 95 D (3); MOR 253 C (F.C.); POE 10 G (3); POE 12 F (F.C.).

Diagnosis: Pleon without dorsal teeth, segment 2 with two or three submedian fascicles of spines on each side; gnathopod 1 with short palm distally produced into a setose lobe into which the dactylus fits.

Remarks: K. H. Barnard (1916) doubtfully synonymized Walker's (1904) *M. tenuicornis* but this has not been accepted since Walker's specimens had pleonal teeth while Barnard's did not.

Distribution: A brackwater species found in India, Ceylon and southern Africa.

Family **Haustoriidae**

Urothoe elegans Bate, 1857

Urothoe elegans: Ledoyer, 1968: 23, pl. 5.

Records: PED 18 X (1).

Diagnosis: Distinguished from other southern African species by articles 4 and 5 of pereopod 3, which are longer than broad; dactyl of pereopod 3 minutely denticulate.

Distribution: Atlantic and Indian Oceans.

Family **Isaeidae**

Cheiriphotis megacheles (Giles, 1885)

Cheiriphotis durbanensis K. H. Barnard, 1916: 247.

Cheiriphotis megacheles: J. L. Barnard, 1962: 17, fig. 4.

Records: MOR 37 W (4); MOR 41 M (2); MOR 45 F (4); MOR 77 X (4); MOR 77 Y (7); MOR 238 E (C.); JAN 12 N (29).

Diagnosis: A polymorphic species, young specimens having a moderately well-developed inner ramus to uropod 3 which disappears in fully developed adults; gnathopod 2 male changes from an oblique palmed form bearing three large teeth to a transverse one bearing four or five small irregular teeth; article 3 of antenna 1 shorter than 1 or 2, accessory flagellum tri-articulate.

Distribution: Indo-Pacific.

Chevalia aviculae Walker, 1904

Chevalia aviculae: K. H. Barnard, 1916: 252. J. L. Barnard, 1970b: 166, fig. 107.

Records: PEA 4 L (5).

Diagnosis: Accessory flagellum of antenna 1 uniarticulate; gnathopod 2 stout, article 6 subquadrate, palm transverse, convex, defined by a strong tooth; pereopods 3 and 5, dactyl bifurcate; urosome segments 1 and 2 coalesced; uropod 3 obliquely truncate and setose, inner ramus longer than outer.

Distribution: Indo-Pacific, west coast of South Africa.

Gammaropsis afra (Stebbing, 1888)

Eurystheus afer: K. H. Barnard, 1916: 249, pl. 28, fig. 11.

Gammaropsis afra: J. L. Barnard, 1970b: 170, fig. 108.

Records: IN 159 H (2).

Diagnosis: Eyes not lageniform; gnathopod 2 palm of two irregular humps, finely crenulate; otherwise resembling *G. atlantica*, of which it may eventually prove to be a variety.

Distribution: Indo-Pacific and eastern Atlantic Oceans.

Gammaropsis atlantica (Stebbing, 1888)

Eurystheus atlanticus: Stebbing, 1908: 86.

Gammaropsis atlantica: J. L. Barnard, 1970b: 174, figs 111-113.

Records: PED 2 M (1); PED 6 J (13); PED 8 Q (present); PED 10 S (15); PED 15 E (present).

Diagnosis: Cephalic lobes moderately projecting, eyes lageniform; accessory flagellum thin, six-articulate in adults; gnathopod 2 article 6 $1\frac{1}{2}$ times as long as broad, palm oblique with a large cavity near the defining angle and a bulge near the hinge.

Remarks: A highly variable species, especially as regards the eyes, which range from lageniform (in South African specimens) to oval. J. L. Barnard (1970b) discusses two phenotypes found in Hawaii and suggests that *G. atlantica* and *G. afra* (Stebbing) may form a single species complex.

Distribution: Eastern Atlantic and Indo-Pacific.

Gammaropsis inhaca n. sp.

Fig. 7

Diagnosis of male: Head equal to two pereon segments, ocular lobes extending half the length of article 1 of antenna 1; eyes oblique, oval, black.

Articles 1 and 3 of antenna 1 equal, shorter than article 2, flagellum fourteen-articulate and 70% the length of peduncle; antenna 2 slightly longer than antenna 1, article 2 produced distally, article 3 curved, flagellum thirteen-articulate.

Mandibular molar large, palp triarticulate, articles 2 and 3 equal, longer than article 1.

Coxa 1 acutely produced forwards to base of antenna 2, distal portion flared outwards; coxae 2-7 small, scarcely touching. Gnathopod 1, article 2 constricted near its origin, article 6 slightly larger than 5, setose on medial surface, palm oblique, a marked concavity near the hinge followed by a large

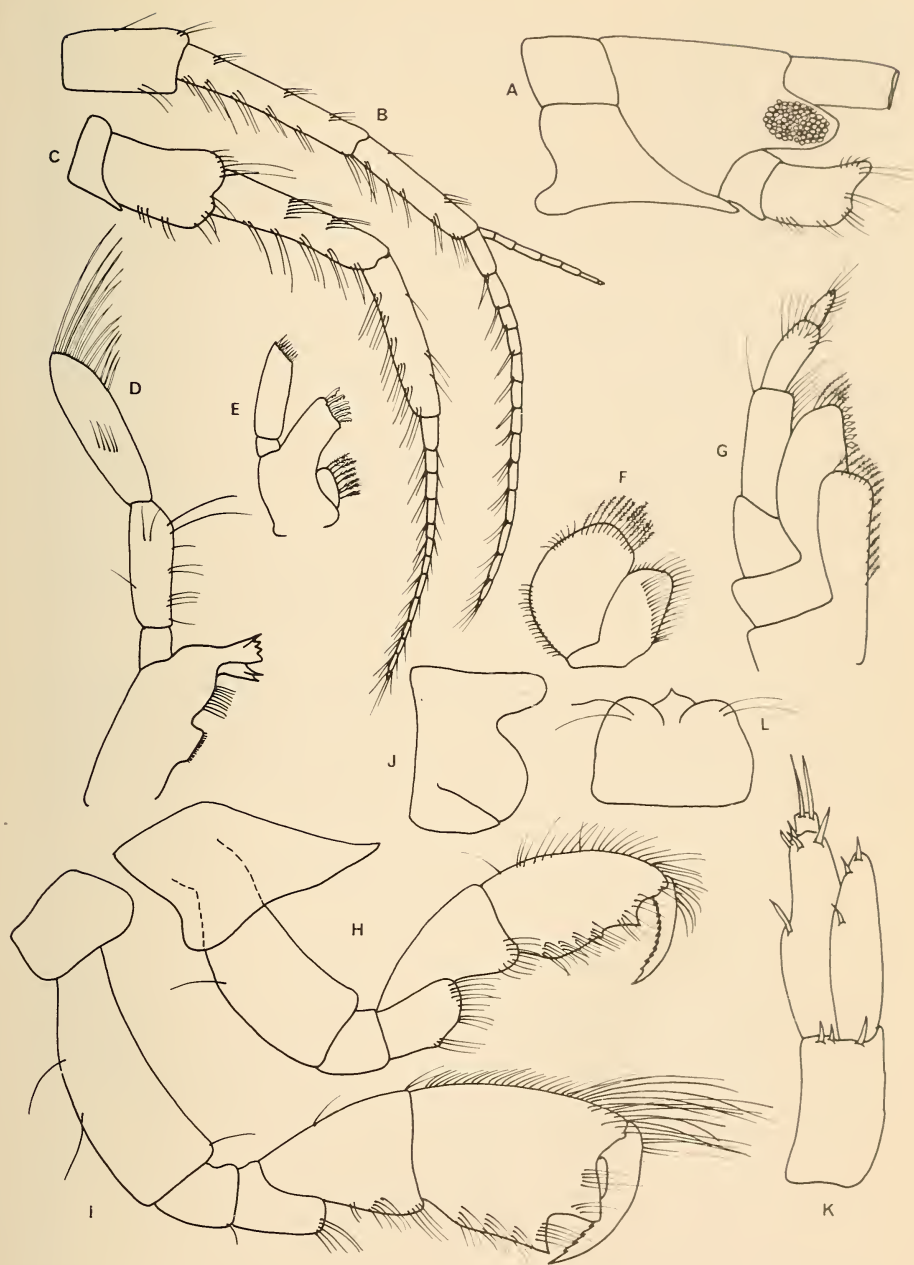


Fig. 7. *Gammaropsis inhaca* n. sp., holotype, male 7 mm.

A. Head. B. Antenna 1. C. Antenna 2. D. Mandible. E. Maxilla 1. F. Maxilla 2. G. Maxilliped.
H. Gnathopod 1. I. Gnathopod 2. J. Pleonal epimeron 3. K. Uropod 3. L. Telson.

tooth; remainder of palm concave, a small tooth at defining angle; dactyl cut into ten teeth, closing onto inner surface of article 6. Gnathopod 2 slightly larger than 1, inner surface of article 6 extremely setose, palm similar to that of gnathopod 1 but more exaggerated, dactyl with four teeth, closing onto inner surface of article 6.

Pereiopods 1 and 2 glandular; article 2 of pereiopods 3-5 not expanded.

Peduncle of uropod 1 with a large distal spine. Uropod 2 not extending beyond uropod 1, peduncle lacking spine. Rami of uropod 3 slightly longer than peduncle, outer ramus slightly exceeding inner, and having a small second article.

Telson quadrate, two subterminal setae on lateral lobes.

Posterior edge of third pleonal epimeron concave proximally, convex distally, postero-inferior corner faintly notched, a diagonal ridge running to the notch.

Colour (as preserved): White, a black area distally on article 2 of gnathopod 1 and of pereiopods 4 and 5.

Holotype: Male, 7 mm, unique. S.A.M. A 13068.

Type-locality: Recovered on intertidal mudflats off the west coast of Inhaca Island by biologists of the South African Museum, June 1971.

Records: IN 160 D.

Remarks: This species is easily distinguished from most others by the large teeth on the palms of gnathopod 1 and 2. Species with similar gnathopods are *G. setiferous*, which has a uniarticulate outer ramus to uropod 3, and *G. kergueleni*, which is probably the closest relative, but which differs in the structure of coxa 1 and by the lack of teeth on the dactyl of gnathopod 2.

Gammaropsis semichelatus (Barnard, 1957)

Eurystheus semichelatus K. H. Barnard, 1957: 8, Fig. 5.

Records: JAN 12 E (7); JAN 14 A (6); PEA 24 D (1).

Diagnosis: Article 2 of gnathopod 2 distally lobed, article 3 strongly lobed, article 6 elongate oblong, distally projecting forwards to form a chela with the short stout dactyl; third pleonal epimeron postero-inferiorly quadrate, minutely notched and with an oblique ridge running diagonally to the notch.

Distribution: Endemic to Natal and Moçambique.

Photis kapapa Barnard, 1970

Fig. 8

Photis kapapa J. L. Barnard, 1970b: 192, figs 124, 125.

Records: MOR 244 A (15); PED 15 P (8).

Diagnosis: Article 2 of gnathopod 2 male distally produced into a large sacklike

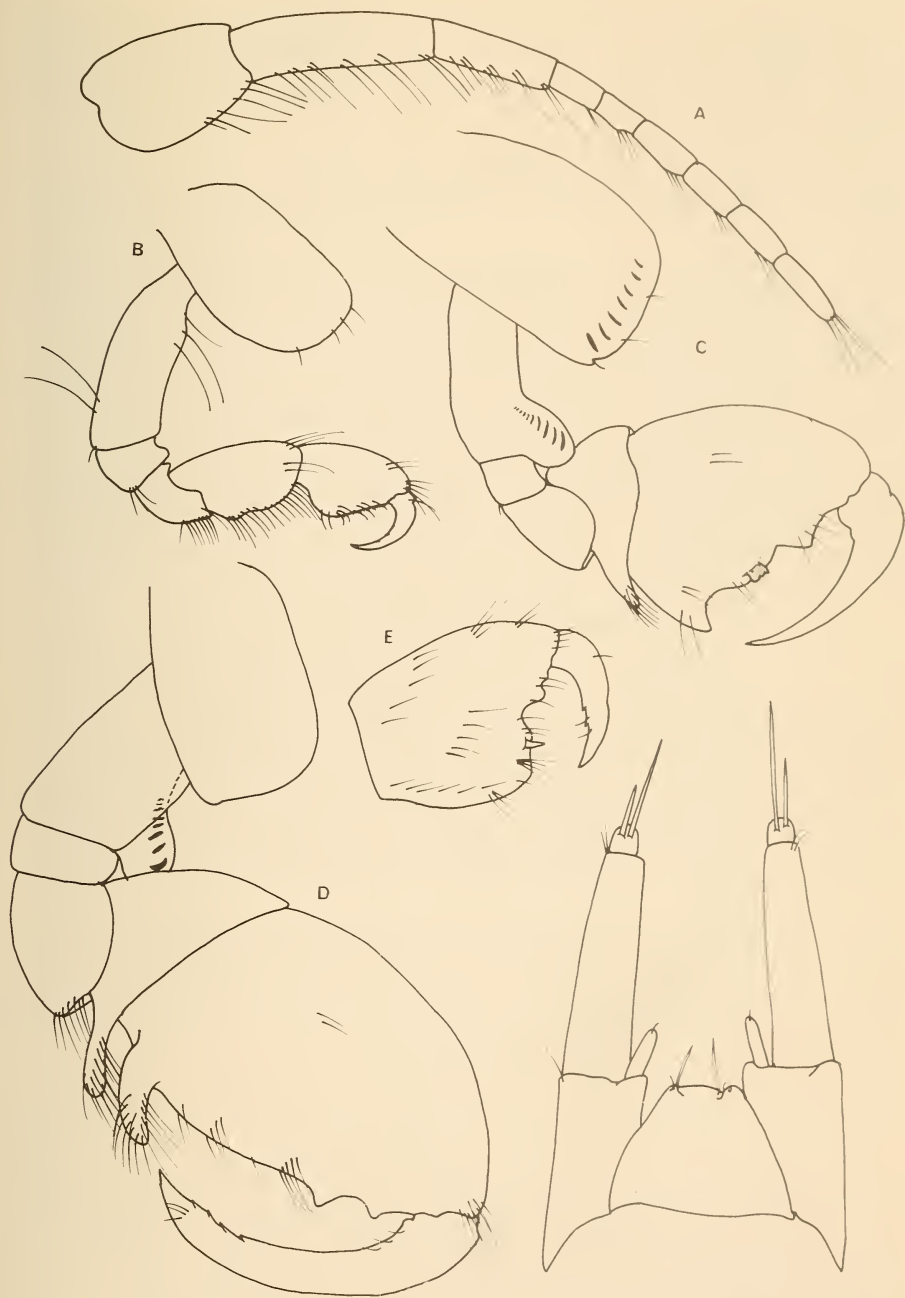


Fig. 8. *Photis kapapa* Barnard

Male, 3 mm: A. Antenna 1. B. Gnathopod 1. C. Gnathopod 2. F. Uropod 3 and telson. Male, 5 mm: D. Gnathopod 2 (inner aspect). Female, 4 mm: E. Gnathopod 2.

lobe bearing stridulation ridges, article 5 cupshaped, with a tumid posterior lobe, article 6 variable, palm slightly to extremely oblique, defined by a large blunt tooth in young male which becomes an elongate curved process in terminal form, bisinuate between defining tooth and finger hinge. Coxae 2 to 4 and sometimes 1 bearing stridulation ridges.

Distribution: Hawaii, Moçambique. This is the first record of the species outside Hawaiian waters.

Remarks: Some of the males in the present collection are considerably larger (5 mm as compared with 2.5 mm) and have more highly developed gnathopods than those figured by Barnard (1970). In its terminal form (Fig. 8d) the palm of gnathopod 2 male is very oblique and the defining tooth has become enlarged into a curved lobe arising from the inner margin of the palm and curving distally and outwards. Small males however show gnathopods (Fig. 8c) very like those figured by Barnard and I have no hesitation in equating the present material with that from Hawaii, the only consistent differences being the length of the spines of uropod 3 and the number of segments of the flagellum of antenna 1 (6 as against 5 in Hawaiian specimens).

Family **Leucothoidae**

Leucothoe spinicarpa (Abildgaard, 1789)

Leucothoe spinicarpa: K. H. Barnard, 1916: 148. Sivaprakasam, 1967: 384, fig. 1.

Records: JAN 14 B (2); 'Portuguese East Africa' (K. H. Barnard 1955).

Diagnosis: Article 6 of gnathopod 1 finely crenulate and spinose, article 7 about half the length of 6; gnathopod 2, process of article 5 densely setose, article 6 massive, palm convex, minutely serrulate throughout; pleon segment 3 postero-inferiorly quadrate.

Remarks: A rather variable species. J. L. Barnard (1962) points out that in immature specimens article 3 of antenna 1 is longer in relation to articles 1 and 2 than in adults. In the past, this relationship has been used as an important taxonomic characteristic and the observation of differential growth may necessitate a taxonomic revision of the genus.

Distribution: Cosmopolitan.

Family **Lysianassidae**

Amaryllis macrophthalma Haswell, 1880

Amaryllis macrophthalma: K. H. Barnard, 1916: 114.

Records: PED 23 R (1); JAN 12 F (6); JAN 12 R (1); PEA 24 A (1).

Diagnosis: Eyes vertically elongate, subcrescentic; pleon segment 3 postero-inferiorly squarely upturned with a little pocket above the point; uropod 2 rami

subequal, the inner markedly constricted a third before the tip; telson extending beyond the peducle of uropod 3, more than 50% cleft, apices not divergent.

Distribution: Indo-Pacific, extending around the South African coast to South West Africa.

Aristias symbiotica Barnard, 1916

Aristias symbiotica K. H. Barnard, 1916: 122.

Records: PED 6 N (1).

Diagnosis: Eyes fairly large, oval to circular; third pleonal epimeron postero-inferiorly quadrate, hind margin finely serrulate; telson as broad as long, two-thirds cleft, each apex with a stout spine set in a notch; hind margins of article 2 of pereopods 3 and 4 with three to four serrations, pereopod 5 with six serrations; uropods with short spines at tips of their peduncles, rami minutely spinulose; uropod 3 rami lanceolate, inner longer than article 1 of outer.

Remarks: All the species of this genus lead a semi-parasitic existence in the branchial cavities of ascidians or sponges.

Distribution: Endemic, South West Africa to Moçambique.

Lysianassa cinghalensis (Stebbing, 1897)

Lysianassa cinghalensis: Ledoyer, 1968: 19, fig. 1.

Records: JAN 12 G (2); IN 159 E (2).

Diagnosis: Eyes large, dark, reniform; article 1 of antenna 1 twice as long and $1\frac{1}{2}$ times as wide as articles 2 plus 3, accessory flagellum tri-articulate; gnathopod 1 simple; coxa 1 with a small setiferous notch on the lower margin; gnathopod 2 very long, article 2 as long as 4 to 6 combined; uropod 2 inner ramus moderately constricted; uropod 3 peduncle slightly keeled; telson entire and oval.

Distribution: Tropical Indian Ocean. This is the first record of this species from the southern African mainland.

Microlysias indica Barnard, 1937

Fig. 9

Microlysias indica K. H. Barnard, 1937: 144.

Records: MOR 102 M (1); MOR 122 T (2); MOR 138 G (1).

Diagnosis: Antenna 2 male half as long as body; article 4 very tumid; gnathopod 1 subchelate, article 6 longer than 5, 1.5 times as long as broad; gnathopod 2, article 5 widening distally, article 2 of pereopods 3-5 feebly serrate.

Remarks: Barnard's original specimens were described as having an indistinct fourth article to the maxillipedal palp but the present specimens have a distinct, though small, fourth article.

Distribution: South Arabian coast, southern Africa.

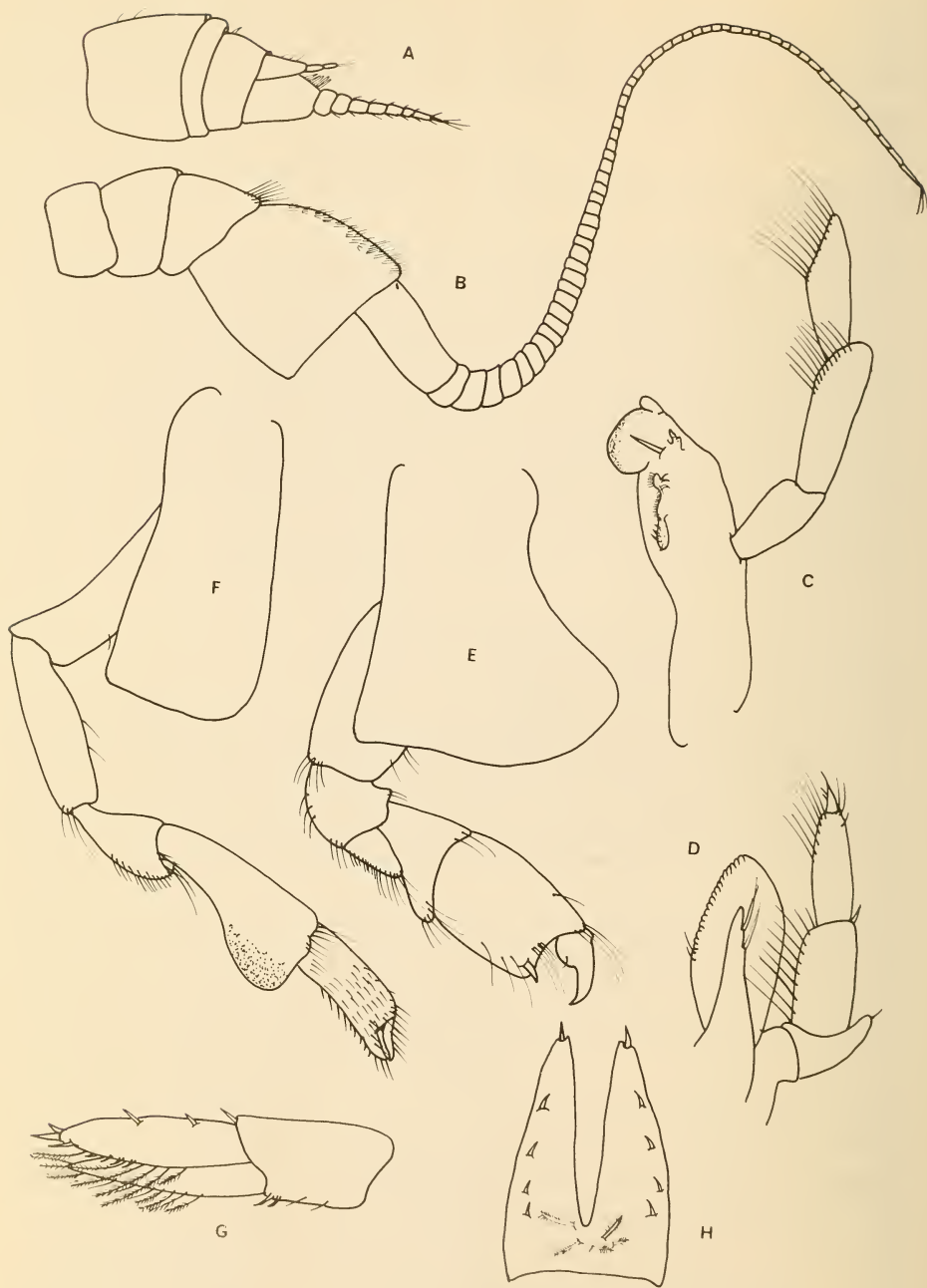


Fig. 9. *Microlysias indica* Barnard, male, 6 mm.

A. Antenna 1. B. Antenna 2. C. Mandible. D. Maxilliped. E. Gnathopod 1. F. Gnathopod 2.
G. Uropod 3. H. Telson.

Trischizostoma circulare Barnard, 1961

Trischizostoma circulare J. L. Barnard, 1961: 51, fig. 20.

Records: 25°36'S/35°21'E, 730 m.

Diagnosis: Article 6 of gnathopod 1 nearly circular, dactyl smooth; rostrum elongate; telson entire; article 6 of gnathopod 2 asymmetrical, distal end produced.

Distribution: The above record is the only one to date.

Trischizostoma sp.

Records: PED 23 T (1 juvenile).

Remarks: The characteristic powerful gnathopods of this individual identify it as a member of the genus *Trischizostoma*. The gnathopods were not, however, sufficiently developed to allow a specific identification. (*T. remipes* Stebbing, 1908 and *T. circulare* are the only species previously recorded from the east coast of Africa.)

Family **Oedicerotidae***Periiculodes longimanus* (Bate & Westwood, 1868)

Periiculodes longimanus: Chevreux & Fage, 1925: 162, figs 163, 164. Ledoyer, 1967: 127, fig. 7.

Records: PED 18 W (1).

Diagnosis: Rostral projection short, lateral corners rounded, eyes broadest dorsally, with about twelve lenses; gnathopods 1 and 2, process of article 5 to tip of article 6, article 6 three times as long as broad; rami of uropod 3 very narrow, unarmed; telson evenly rounded, twice as long as broad.

Distribution: Mediterranean, Atlantic, Indian Ocean.

Synchelidium haplocheles (Grube, 1864)

Synchelidium haplocheles: Sars, 1895: 318, pl. 112, fig. 1.

Records: MOR 212 K (1).

Diagnosis: Rostrum short, evenly curved; eyes large, round, bright red; process of article 5 of gnathopod 1 produced well beyond hind margin of article 6; article 6 medially widened, palm longer than hind margin and having six large, blunt denticles; gnathopod 2 slender, chela one-fifth the length of article 6.

Distribution: North Atlantic, Mediterranean, Ceylon, southern Africa.

Family **Phoxocephalidae***Metaphoxus* sp.

Fig. 10

Diagnosis: Rostrum longer than peduncle of antenna 1, evenly tapering, tip rounded. Eyes consisting of about 12 ocelli. Antennia 1 as long as head, flagellum ten-articulate, accessory flagellum eight-articulate. Antenna 2 equal to antenna 1.

Mandibular molar reduced to nine spines; mandibular palp with article 3 distally expanded. Maxilla 1 palp uniarticulate, inner lobe bearing three spines. Maxillipedal palp article 4 elongated, bearing a strong spine at its tip. Gnathopod 1 about half the size of gnathopod 2, palms of both gnathopods slightly oblique, convex, defined by a rounded convexity.

Pereiopod 1, article 2 with four long setae posteriorly, article 4 $1\frac{1}{2}$ times longer than broad, anteriorly slightly produced to overlap article 5; article 5 almost as broad as long; article 6 slender with six heavy spines along posterior margin, the last extending to the tip of the dactyl and comparable in width to it. (Pereiopods 2 and 3 are missing.)

Pereiopod 5, article 2 serrate posteriorly and anteriorly, article 4 with two fascicles of spines posteriorly. Second pleonal epimeron bearing a group of five plumose setae on its outer surface. Third pleonal epimeron quadrate.

Uropod 1, rami subequal. Uropod 2, peduncle with two dorsal and one terminal spine, inner ramus nearly twice as long as outer. Uropod 3 rami foliaceous, fringed with long plumose setae.

Material: A single damaged male, 10 mm, recovered in two portions such that pereiopods 3 and 4 were missing on both sides. Unique.

Records: PED 18 V (1).

Remarks: Distinguished from other members of the genus by the very long rostrum, the setae on the second pleonal epimeron, and the third uropods. The gnathopods resemble those of *M. simillimus* and *M. pectinatus* but the defining lobes are more rounded and not spinose.

Family **Podoceridae***Laetmatophilus purus* Stebbing, 1888

Laetmatophilus purus Stebbing, 1888: 1198, pl. 132. K. H. Barnard, 1916: 274.

Records: MOR 243 Z (80).

Diagnosis: Article 2 of gnathopod 2 broad, channeled anteriorly, article 6 with palm long, undefined, a broad lobe near the hinge followed by a narrow blunt tooth; pereon transversely corrugated; articles 5 and 6 of gnathopod 1 subequal and setose, 6 abruptly widening at its base, dactyl toothed.

Distribution: Endemic, South West Africa to Morrumbene.

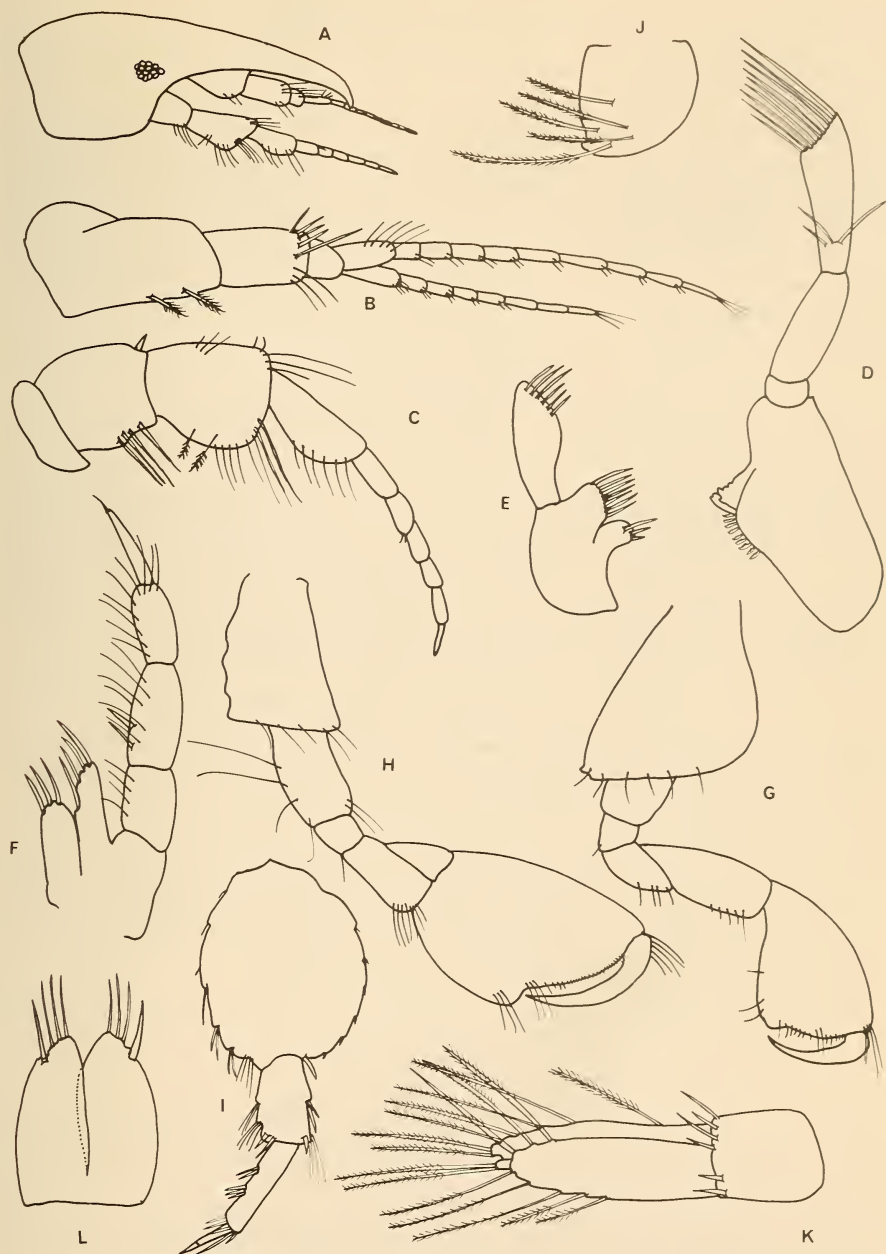


Fig. 10. *Metaphoxus* sp., male, 10 mm.

A. Head. B. Antenna 1. C. Antenna 2. D. Mandible. E. Maxilla 1. F. Maxilliped. G. Gnathopod 1. H. Gnathopod 2. I. Pereiopod 5. J. Pleonal epimeron 2. K. Uropod 3. L. Telson.

Laetmatophilus tridens Barnard, 1916

Laetmatophilus tridens K. H. Barnard, 1916: 275, pl. 28, fig. 22.

Records: PED 10 Q (1).

Diagnosis: Pereon segments 2-4 with small medio-dorsal tubercles; dactyl of gnathopod 1 very thick and very convex, distally cut into ten closely-set spine-teeth; article 2 of gnathopod 2 with two anterior keels, one ending acutely, the other subacutely, palm setose, distally bearing three teeth, that closest to the hinge triangular, the second cylindrical and the third broad and denticulate.

Distribution: Endemic, Saldanha Bay to Moçambique.

Podocerus cristatus (Thompson, 1879)

Podocerus cristatus: K. H. Barnard, 1916: 276. J. L. Barnard, 1962: 67, fig. 31.

Records: PED 15 G (4).

Diagnosis: Pereon segments 6 and 7 and pleon segments 1 and 2 medio-dorsally carinate (on large specimens small carinae may also appear on segments 5 or even 4 and 3); gnathopod 2 palm bearing a denticulate lobe near the hinge followed by a conical tooth.

Distribution: Cosmopolitan in tropical and warm-temperate seas.

Podocerus inconspicuus (Stebbing, 1888)

Podocerus palinuri K. H. Barnard, 1916: 277, pl. 28, fig. 23.

Podocerus inconspicuus: Pirlot, 1938: 356, fig. 160.

Records: PED 16 W (1).

Diagnosis: Head with a low rounded dorsal keel; pereon segments 1-7 and pleon segments 1 and 2 dorsally carinate; gnathopod 2 male with palm bearing a flat tooth near the hinge and a small conical one below it.

Distribution: Indian Ocean and west coast of South Africa.

Family **Stenothoidae***Stenothoe gallensis* Walker, 1904

Stenothoe gallensis: K. H. Barnard, 1916: 154; 1925: 344. J. L. Barnard, 1955: 3 fig. 1.

Records: JAN 12 S (2).

Diagnosis: Gnathopod 2 male with hind margin of article 4 finely crenulate, palm straight, densely hirsute, a double tooth near base of dactylus; uropod 3 uniramous, ramus bi-articulate and slightly shorter than peduncle, article 2 curved upwards, finely denticulate dorsally.

Distribution: Mediterranean, Caribbean, Hawaii, Indian Ocean.

Stenothoe valida Dana, 1853

Stenothoe affinis: K. H. Barnard, 1925: 345.

Stenothoe valida: Ledoyer, 1967: 125, fig. 4b. Sivaprakasam, 1967: 373, fig. 2a-b.

Records: JAN 12 Q (1); Cabo da Inhaca (Kalk 1958).

Diagnosis: Gnathopod 2 male with the hind margin of article 4 entire, palm slightly concave, a large, distally directed tooth and a marked incision near the base of the dactylus; uropod 3, article 2 of ramus straight, not denticulate.

Distribution: Cosmopolitan in tropical and temperate seas.

Superfamily TALITROIDEA

Family **Hyalidae***Hyale grandicornis* Kröyer, 1845

Hyale grandicornis: K. H. Barnard, 1916: 230. Stephensen, 1949: 33, figs 14-15. K. H. Barnard, 1955: 93, fig. 46.

Records: Among seaweeds on the east coast of Inhaca Island (Macnae & Kalk, 1958).

Diagnosis: Eyes large, nearly meeting on top of the head; gnathopod 2 article 2 not lobed, article 3 with a small lobe, palm of male oblique, with a pocket-like cavity and a double tubercle carrying two spines defining it from a fairly long hind margin.

Remarks: *Hyale grandicornis* Kröyer and *Hyale novaezealandia* (Thompson) were at one stage separated by differences in spination of uropods 1 and 2 and pereopod 4. K. H. Barnard (1916) found that these characters were not consistently correlated in different populations and united the species. Apparently, one of the several forms predominates in any one population to the almost complete exclusion of the other forms. Hurley (1957) suggests that environmental factors determine the genetic balance achieved by different populations.

Distribution: Indo-Pacific, Tristan da Cunha, South West Africa, Gough Island.

Parhyale inyacka (Barnard, 1916)

Hyale inyacka K. H. Barnard, 1916: 233, pl. 23, fig. 4.

Parhyale inyacka: J. L. Barnard, 1955: 23, fig. 12. Sivaprakasam, 1969b: 562, fig. 6.

Records: IN 159 B (1); MOR 40 Z (18); MOR 75 A (11); MOR 232 D (3).

Diagnosis: Antenna 2 half body length, twice as long as antenna 1; gnathopod 2 male with article 6 elongate-oval, palm oblique, convex; pereopod 3 with hind margin of article 2 serrate, a marked indent centrally; article 6 of pereopods 4 and 5 spinose posteriorly; peduncle of uropod 3 slightly longer than outer ramus, inner ramus small but distinct.

Remarks: Shoemaker (1956), in a review of the genus, united *P. inyacka* (Barnard) with *Hyale hawaiiensis* (Dana) but this has not been accepted by Bulycheva (1957) or Sivaprakasam (1969b).

Distribution: Cosmopolitan in warm-temperate and tropical seas.

Family **Talitridae**

Orchestia ancheidos (Barnard, 1916)

Talorchestia ancheidos: K. H. Barnard, 1916: 221, pl. 27, figs 35–36; 1940: 470, fig. 31.

Records: MOR 179 A (5); MOR 180 A (abundant); MOR 193 A (1); POE 8 A (common); Masiene (near Limpopo River mouth) (Barnard 1940).

Diagnosis: Eyes separated by less than their diameter; coxa 2 with a strong rounded lobe on upper posterior edge; gnathopod 1 male, article 5 strongly expanded distally and longer than subtriangular article 6; gnathopod 2 male, article 6 oval, widest at its midpoint, palm convex, spinose, forming an almost even curve with hind margin, dactyl strongly curved.

Distribution: Malagasy, Moçambique, South Africa.

Orchestia anomala Chevreux, 1901

Talorchestia malayensis: K. H. Barnard, 1955: 93.

Orchestia anomala: Sivaprakasam, 1969a: 297, fig. 1.

Records: Among *Botrychia* on intertidal rock faces, west coast of Inhaca and along drift line, Northern Bay (Macnae & Kalk, 1962).

Diagnosis: Articles 4–6 of gnathopod 1 male with scabrous lobes; dactyl of gnathopod 2 male with averted point; hind margin of article 2 of pereopod 5 with numerous serrations, pleonal epimera 2 and 3 with submarginal ridges.

Remarks: K. H. Barnard (1935) united *T. malayensis* Tattersall with his *Orchestia floresiana*, which were synonymized with *O. anomala* Chevreux by Schellenberg (1938). Barnard again, however, recorded *T. malayensis* as a distinct species in 1955. The synonymy established by Schellenberg is nevertheless generally accepted since *T. malayensis* shows a palm in the female gnathopod 1.

Distribution: Indo-Pacific.

Orchestia notabilis (Barnard, 1935)

Fig. 11.

Parorchestia notabilis K. H. Barnard, 1935: 291, fig. 8.

Records: MOR 85 B (6); MOR 95 C (4).

Diagnosis: Gnathopod 2 male strongly developed, article 6 ovate, the straight palm separated from the hind margin by a slight step, one conical tooth in the

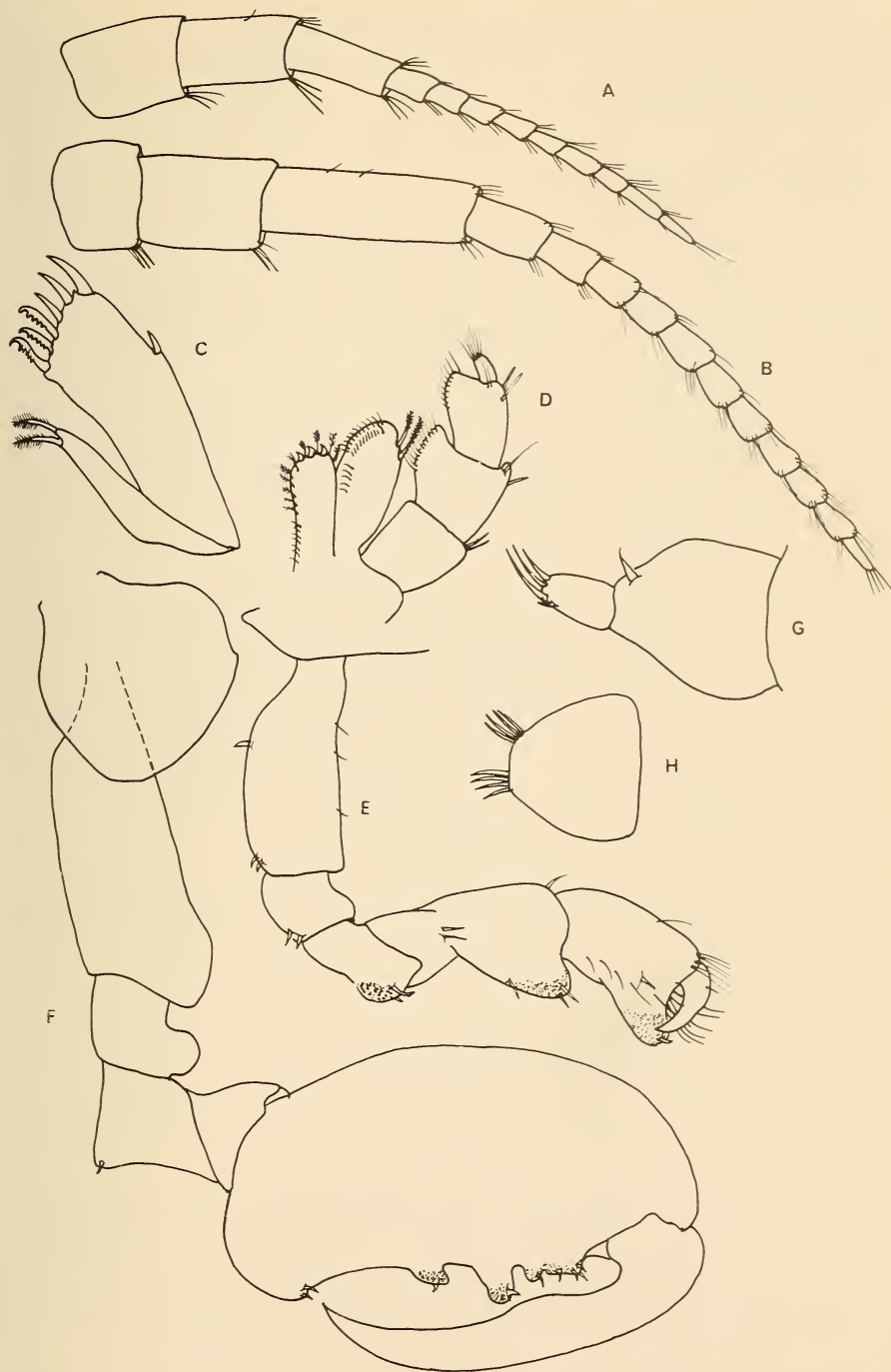


Fig. 11. *Orchestia notabilis* (Barnard), male, 9 mm.

A. Antenna 1. B. Antenna 2. C. Maxilla 1. D. Maxilliped. E. Gnathopod 1. F. Gnathopod 2.
G. Uropod 3, lateral view. H. Telson.

centre of the palm, a slightly larger one distally and two small rounded projections between the latter and the hinge; inner margin of dactyl sinuous, tip not averted; pereopod 5, article 2 with slight and widely spread setiferous indents.

Distribution: India, Moçambique.

Talorchestia australis Barnard, 1916

Talorchestia australis K. H. Barnard, 1916: 220, pl. 27, figs 33-34; 1940: 470, fig. 30.

Records: MOR 250 F (2); MOR 255 F (1); IN 159 F (fairly common).

Diagnosis: Eyes distance apart equal to diameter; coxa 2 not lobed posteriorly; gnathopod 1 male, article 5 triangular with a prominent apical lobe, longer than article 6, article 6 not strongly expanded, apically lobed, palm concave; article 6 of gnathopod 2 male oblong, widest across the defining angle, palm nearly transverse, slightly convex, a small pellucid lobe at palmar angle, spinose, dactyl matching palm, evenly curved.

Distribution: Endemic, South West Africa to Moçambique.

Suborder CAPRELLIDEA

Family **Aeginellidae**

Metaprotella haswelliana (Mayer, 1882)

Metaprotella haswelliana: Sundara Raj, 1927: 126, pl. 16. McCain & Steinberg, 1970: 54.

Records: MOR 212 J (3).

Diagnosis: Last two thoracic segments fused, segment 5 long and slender; pereopods 1 and 2 almost as long as branchiae; dorsal surface of head and body spinose; article 1 of antenna 1 bearing a small tubercle with 1 seta.

Distribution: Indo-Pacific.

Monoliropus falcimanus Mayer, 1904

Monoliropus falcimanus: Sivaprakasam, 1967: 382, fig. 4g-h. McCain & Steinberg, 1970: 56.

Records: PED 7 N (1); PED 20 U (4).

Diagnosis: Hand of gnathopod 2 male long, slender, sickle-shaped, the palmar edge covered by long setae; basis of gnathopod 2 slender with lateral ridges, longer than pereon segment 2; branchiae long and slender; pereopods 1 and 2 very small; penultimate joint of maxillipedal palp produced into a pointed process; flagellum of antenna 1 nine-articulate in male and eight-articulate in female.

Distribution: Ceylon, India, Moçambique. This is the first record from Africa.

Orthoprotella mayeri Barnard, 1916

Orthoprotella mayeri K. H. Barnard, 1916: 284; 1925: 372. McCain & Steinberg, 1970: 57.

Records: PED 8 N (4); PED 15 S (3); PED 20 T (5); on the hydroid *Lytocarpus philippinus* on Inhaca Island (Macnae & Kalk, 1958).

Diagnosis: Young specimens smooth, but those over 10 mm with lateral spines on the anterior margins of segment 2 and above the base of gnathopod 2; segment 3 also with antero-lateral spines and a pair of dorsal tubercles; gnathopod 2 with palm sparingly setose, a single triangular tooth near the finger hinge with a narrow parallel-sided slit cut in the apex and extending nearly to the basal line; pereopods 1 and 2 half as long as branchiae, uniarticulate, apically setose.

Distribution: Indo-Pacific.

Family **Caprellidae***Caprella equilibra* Say, 1818

Caprella equilibra: McCain, 1968: 25-30, figs 12-13. McCain & Steinberg, 1970: 19.

Records: JAN 12 L (18).

Diagnosis: Basis of gnathopod 2 less than half the length of pereon segment 2; a spine between the insertions; palm very oblique, defined by a small tooth and with a large rectangular tooth distally; large males with very elongate pereon segment 2 and peduncular articles of antenna 1 enlarged.

Distribution: Cosmopolitan, 0-300 m.

Caprella scaura Templeton, 1836

Caprella scaura: K. H. Barnard, 1925: 371. McCain, 1968: 40-44, figs 17-18. McCain & Steinberg, 1970: 37.

Records: On *Cymodocea*, Inhaca Island (Macnae & Kalk, 1958).

Diagnosis: Large, anteriorly-directed cephalic spine; pereon segments 1-2 male elongate, basis of gnathopod 2 equal to pereon segment 2; gnathopod 2 male with hand elongate, palm with two teeth and a distal rectangular projection.

Remarks: K. H. Barnard (1925) amalgamated *C. laevipes* Mayer with *C. scaura* but this synonymy has not been followed, since *C. laevipes* does not bear grasping spines on the pereopods.

Distribution: Cosmopolitan.

Hemiaegina minuta Mayer, 1890

Hemiaegina minuta: McCain, 1968: 61-64, figs 29-30. McCain & Steinberg, 1970: 51.

Records: JAN 14 C (1).

Diagnosis: Flagellum of antenna 2 bi-articulate; mandibular palp absent, molar present; in dorsal view, pereonites centrally expanded; pereopods 1 and 2 uniarticulate; a pair of ventral spines between the insertions of gnathopod 2.

Distribution: Cosmopolitan in warm and temperate seas.

Family **Phtisicidae***Phtisica marina* (Slabber, 1769)

Phtisica marina: K. H. Barnard, 1916: 283. McCain, 1968: 91-97, fig. 46. McCain & Steinberg 1970: 64.

Records: PED 15 R (1).

Diagnosis: Head anteriorly rounded; gnathopod 1 male, hand subtriangular, palm very oblique, defined by a projecting lobe armed with several spines; gnathopod 2 male, carpus shorter than merus, hand widest proximally, palm defined by two grasping spines, otherwise lacking teeth; pereopods 1 and 2 six-segmented.

Distribution: Atlantic, extending into the Mediterranean and Black Sea, and around southern Africa as far as Moçambique.

SUMMARY

A synthesis is presented of the known gammaridean and caprellid amphipod fauna of Moçambique south of 20°S. Material was collected by the University of Cape Town and the South African Museum, reference also being made to specimens collected by the University of the Witwatersrand. Samples were taken at Morrumbene estuary, Inhaca Island, Jangamo reef, Maxixe, Lagoa Poelela, Ponta Zavora and by dredging to depths up to 135 m, a total of 65 species being recovered. One genus *Janice*, and three species, namely *Gitanopsis mariae*, *Janice spinidactyla* and *Gammaropsis inhaca* are described as new to science. Five others, namely *Paragrubia vorax* Chevreux, *Photis kapapa* Barnard, *Lyssianassa cinghalensis* (Stebbing), *Monoliropus falcimanus* Mayer and *Maera serrata* Schellenberg, are new records for southern Africa (here defined as Africa south of 20°S).

Brief diagnoses, references and distributions are given for each species.

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REFERENCES

- BARNARD, J. L. 1955. Gammaridean Amphipoda (Crustacea) in the collection of the Bishop Museum. *Bull. Bernice P. Bishop Mus.* **215**: 1-46.
BARNARD, J. L. 1959. Ecology of Amphipoda and Polychaeta of Newport Bay, California. Part II. Estuarine Amphipoda. *Occ. Pap. Allan Hancock Fdn* **21**: 13-69.

- BARNARD, J. L. 1961. Gammaridean Amphipoda from depths of 400 to 6 000 metres. *Galathea Rep.* **5**: 23-128.
- BARNARD, J. L. 1962. Benthic marine Amphipoda of southern California: families Aoridae, Photidae, Ischyroceridae, Corophiidae, Podoceridae. *Pacif. Nat.* **3**: 1-72.
- BARNARD, J. L. 1964. Los anfipodos bentonicos marinos de la costa occidental de Baja California. *Revta. Soc. mex. Hist. nat.* **24**: 205-274.
- BARNARD, J. L. 1965. Marine Amphipoda of atolls in Micronesia. *Proc. U.S. natn. Mus.* **117**: 459-552.
- BARNARD, J. L. 1969. The families and genera of marine gammaridean Amphipoda. *Bull. U.S. natn. Mus.* **271**: 1-535.
- BARNARD, J. L. 1970a. The identity of *Dexamonica* and *Prinassus* with a revision of Dexaminidae (Amphipoda). *Crustaceana* **19**: 161-180.
- BARNARD, J. L. 1970b. Sublittoral Gammaridea (Amphipoda) of the Hawaiian Islands. *Smithson. Contr. Zool.* **34**: 1-286.
- BARNARD, K. H. 1916. Contributions to the crustacean fauna of South Africa. 5. The Amphipoda. *Ann. S. Afr. Mus.* **15**: 105-302.
- BARNARD, K. H. 1925. Contributions to the crustacean fauna of South Africa. No. 8. Further additions to the list of Amphipoda. *Ann. S. Afr. Mus.* **20**: 319-380.
- BARNARD, K. H. 1935. Report on some Amphipoda, Isopoda and Tanaidacea in the collection of the Indian Museum. *Rec. Indian Mus.* **37**: 279-319.
- BARNARD, K. H. 1940. Contributions to the crustacean fauna of South Africa. XII. Further additions to the Tanaidacea, Isopoda and Amphipoda, together with keys for the identification of hitherto recorded marine and fresh-water species. *Ann. S. Afr. Mus.* **32**: 381-543.
- BARNARD, K. H. 1951. New records and descriptions of new species of isopods and amphipods from South Africa. *Ann. Mag. nat. Hist.* (12) **4**: 698-709.
- BARNARD, K. H. 1955. Additions to the fauna-list of South African Crustacea and Pycnogonida. *Ann. S. Afr. Mus.* **43**: 1-107.
- BARNARD, K. H. 1957. Additions to the fauna-list of South African Crustacea. *Ann. Mag. nat. Hist.* (12) **10**: 1-12.
- CHEVREUX, E. & FAGE, L. 1925. Amphipodes. *Faune Fr.* **9**: 1-488.
- DAY, J. H. 1969. *A guide to the marine life on South African shores*. Cape Town: Balkema.
- DICK, R. I. 1970. Hyperiidea (Crustacea: Amphipoda). Keys to South African genera and species and a distribution list. *Ann. S. Afr. Mus.* **57**: 25-86.
- HURLEY, D. E. 1957. Studies on the New Zealand amphipodan fauna. No. 14. The genera *Hyale* and *Allorchestes* (Family Talitridae). *Trans. R. Soc. N.Z.* **84**: 903-933.
- KALK, M. 1958. Ecological studies on the shores of Moçambique. 1. The fauna of intertidal rocks at Inhaca Island, Delagoa Bay. *Ann. Natal Mus.* **14**: 189-242.
- LEDOYER, M. 1967. Amphipodes gammariens des herbiers de phanérogames marines de la région de Tuléar (République Malgache). Étude systématique et écologique. *Annls Univ. Madagascar* (Sci. nat. Math.) **5**: 121-170.
- LEDOYER, M. 1968. Amphipodes gammariens de quelques biotopes de substrat meuble de la région de Tuléar (République Malgache). Études systématique et écologique. *Annls Univ. Madagascar* (Sci. nat. Math.) **6**: 249-296.
- MACNAE, W. & KALK, M. 1958. *A natural history of Inhaca Island, Moçambique*. Johannesburg: Witwatersrand University Press.
- MACNAE, W. & KALK, M. 1962a. The fauna and flora of sand flats at Inhaca Island, Moçambique. *J. Anim. Ecol.* **31**: 93-128.
- MACNAE, W. & KALK, M. 1962b. The ecology of the mangrove swamps at Inhaca Island, Moçambique. *J. Ecol.* **50**: 19-34.
- MAYER, P. 1904. Report on the Caprellidae collected by Professor Herdman, at Ceylon, in 1902. In ROYAL SOCIETY. *Report to the government of Ceylon on the pearl oyster fisheries of the Gulf of Manaar*, by W. A. Herdman. Part II (suppl. rep. 16): 223-228. London: the Society.
- MCCAIN, J. C. 1968. The Caprellidae (Crustacea: Amphipoda) of the western North Atlantic. *Bull. U.S. natn. Mus.* **278**: 1-147.
- MCCAIN, J. C. 1970. Familial taxa within the Caprellidea (Crustacea: Amphipoda). *Proc. biol. Soc. Wash.* **82**: 837-842.
- MCCAIN, J. C. & STEINBERG, E. 1970. Amphipoda 1, Caprellidea 1, Fam. Caprellidea. *Crustaceorum Cat.* **2**: 1-78.

- PIRLOT, J. M. 1938. Les amphipodes de l'expédition du Siboga, Deuxième partie: Les amphipodes gammarides, III: Les amphipodes littoraux. 2: Familles des Dexaminidae, Talitridae, Aoridae, Photidae, Ampithoidae, Corophiidae, Jassidae, Cheluridae et Podoceridae. *Siboga Exped. monogr.* **33f**: 329-359.
- SARS, G. O. 1895. *An account of the Crustacea of Norway, with short descriptions and figures of all the species.* 1. Amphipoda. Christiania, Copenhagen: Cammermeyers.
- SHOEMAKER, C. R. 1935. The amphipods of Porto Rico and the Virgin Islands. In NEW YORK ACADEMY OF SCIENCES. *Scientific survey of Porto Rico and the Virgin Islands.* **15** (2): 229-262. New York: the Academy.
- SIVAPRAKASAM, T. E. 1966. Amphipoda from the east coast of India. *J. mar. biol. Ass. India* **8**: 82-122.
- SIVAPRAKASAM, T. E. 1967. Notes on some amphipods from the south east coast of India. *J. mar. biol. Ass. India* **9**: 372-383.
- SIVAPRAKASAM, T. E. 1968. A new species and a new record of Amphipoda from the Madras coast. *J. mar. biol. Ass. India* **10**: 274-282.
- SIVAPRAKASAM, T. E. 1969a. Amphipoda from the east coast of India—2. Gammaridea and Caprellidea. *J. Bombay nat. Hist. Soc.* **66**: 297-309.
- SIVAPRAKASAM, T. E. 1969b. Amphipoda from the east coast of India—2. Gammaridea and Caprellidea. *J. Bombay nat. Hist. Soc.* **66**: 560-577.
- STEBBING, T. R. R. 1888. Report on the Amphipoda collected by H.M.S. *Challenger* during the years 1873-76. *Rep. Voy. Challenger 1873-76* (Zool.) **29**: i-xxiv, 1-1737.
- STEBBING, T. R. R. 1904. Gregarious Crustacea from Ceylon. *Spolia zeylan.* **2**: 1-29.
- STEBBING, T. R. R. 1906. Amphipoda. 1. Gammaridea. *Tierreich* **21**: i-xxxix, 1-806.
- STEBBING, T. R. R. 1908. South African Crustacea. (Part IV.) *Ann. S. Afr. Mus.* **6**: 1-96.
- STEBBING, T. R. R. 1910a. General catalogue of South African Crustacea. (Part V of S.A. Crustacea.) *Ann. S. Afr. Mus.* **6**: 447-473.
- STEBBING, T. R. R. 1910b. Scientific results of the trawling expedition of H.M.C.S. 'Thetis' off the coast of New South Wales in February and March, 1898. Crustacea. Part 5. Amphipoda. *Mem. Aust. Mus.* **4**: 565-658.
- STEPHENSEN, K. 1932. Some new amphipods from Japan. *Annotnes zool. jap.* **13**: 487-501.
- STEPHENSEN, K. 1949. The Amphipoda of Tristan da Cunha. *Results Norw. scient. Exped. Tristan da Cunha* **3** (19): 1-61.
- SUNDARA RAJ, B. 1927. Suborder Caprellidea (Laemodipoda). The littoral fauna of Krusadai Island in the Gulf of Manaar. *Bull. Madras Govt Mus. new Ser.* (Nat. Hist.) **1** (1): 125-128.
- WALKER, A. O. 1904. Report on the Amphipoda collected by Professor Herdman, at Ceylon, in 1902. In ROYAL SOCIETY. *Report to the government of Ceylon on the pearl oyster fisheries of the Gulf of Manaar*, by W. A. Herdman. Part II (suppl. rep. 17): 229-300. London: the Society.